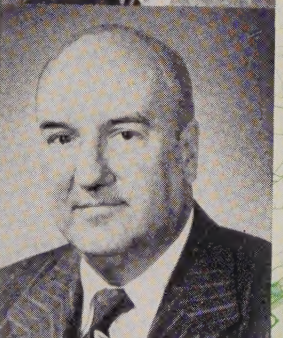
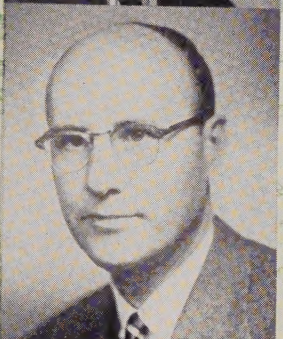
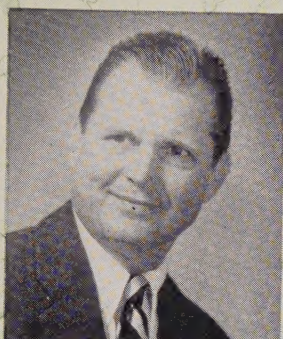
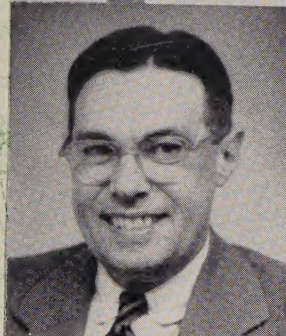
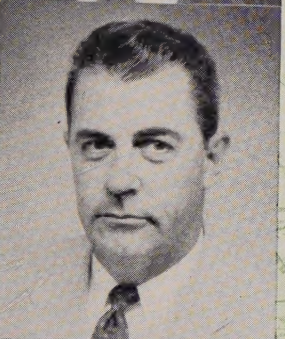
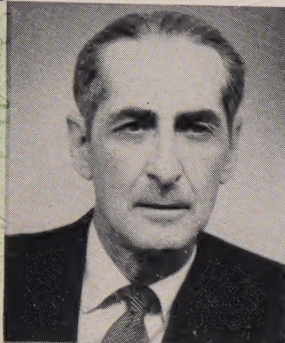




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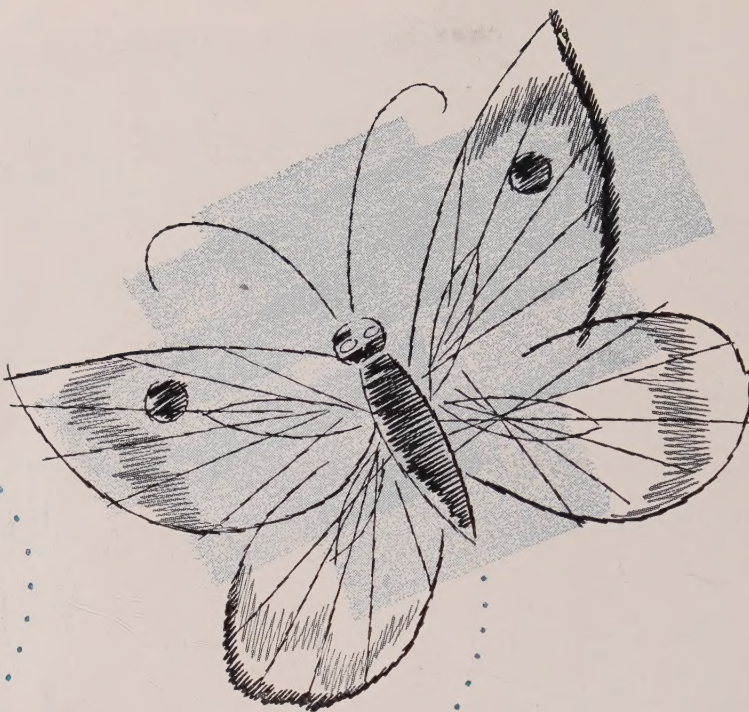
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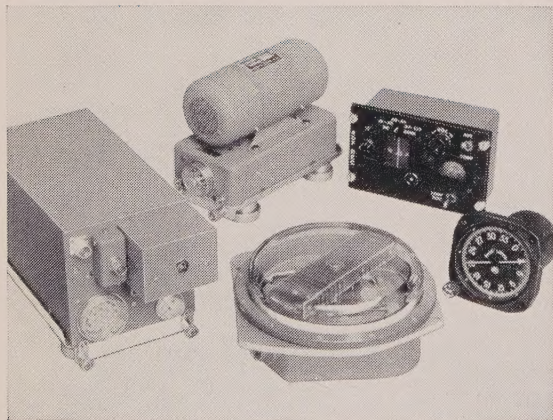
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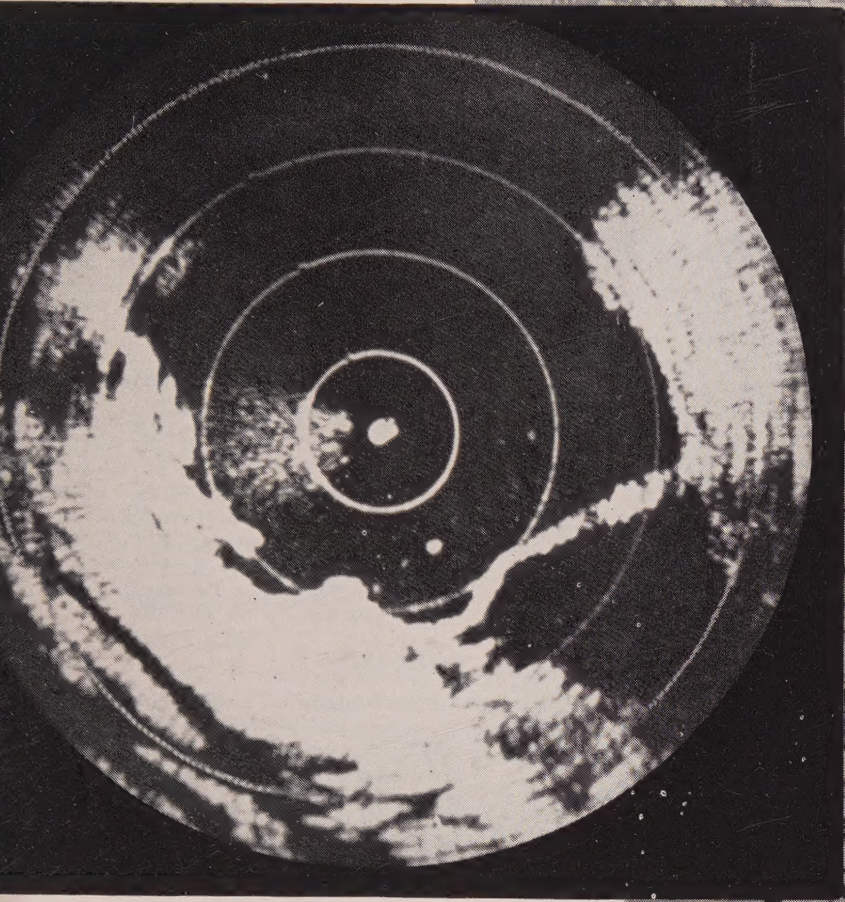
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WHEN A PILOT NEEDS A LANDMARK...



Circled portion of aeronautical chart as seen on scope of AVQ-10 on in-bound airliner (Note Hayward-San Mateo County bridge).

the exceptional ground-mapping properties of RCA's Weather Radar will spot his position

Air carriers find RCA's new Weather Radar (AVQ-10) invaluable in making landfalls and recognizing landmarks under adverse weather conditions in areas where navigation aids are comparatively inadequate.

The AVQ-10 provides a crosscheck on normal navigation methods, enabling the pilot and navigator to determine their position with great exactness relative to the coast line. This is equally true on inland routes where topographical features show up clearly on the scope. The AVQ-10 also helps to locate the proper entry point in defense areas, where aircraft are limited to "corridors."

These ground-mapping characteristics are in addition to the recog-

nized superiority of the AVQ-10 as a weather radar. It is the first airborne radar to use the C-band (5.6 cm) transmission, the wavelength best suited to weather detection and avoidance, yet having the least amount of scope clutter. With it, the pilot can evaluate storms up to 150 miles ahead and pick non-turbulent paths between them. In addition to avoiding costly detours, the AVQ-10 contributes materially to passenger comfort.

All this has made the demand for the AVQ-10 great and pressing. Many leading airlines have already specified it. To secure early installation, other airline and executive plane operators are invited to write now for further information.



Portion of sectional aeronautical chart looking north on San Francisco Bay area.



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Propeller service, overhaul, modification, replacement

Check your needs — fly in

PACIFIC AIRMOTIVE CORPORATION

Lockheed Air Terminal,
Burbank, California

now hear this . . .

PERSONNEL

George L. Bright has been promoted to Director of Sales Training at Mohawk Airlines. **Harry W. Peachey** has been named manager for Mohawk operations at Broome County Airport, and **Robert S. Van Woert** succeeds Peachey as lead agent.

George M. Gross, formerly Assistant Superintendent of Maintenance for Southern Airways, has been promoted to Superintendent of Maintenance.

Vernon D. Hauck, formerly Factory Manager of the Friez Division of Bendix Aviation, has been appointed to the new position of Assistant General Manager.

Dr. Ralph P. Johnson and Frederick C. Crawford have been elected to the board of directors of the Ramo-Wooldridge Corp., Los Angeles.

Glenn E. Seidel has been appointed to the newly-created corporate position of Vice President in Charge of Engineering for Minneapolis-Honeywell Regulator Co.

Robert W. Kirk and D. A. J. Foster have been appointed Taylorcraft distributors for Alberta, Can., and the Northwest Territories.

Sol Schneiderman has been appointed Senior Project Engineer at Radio Receptor Co., Bklyn.

Charles D. Hilles, Jr., has been appointed Executive Vice President of International Telephone and Telegraph Corp. **Henri G. Busignies**, Executive Vice President of Federal Telecommunication Laboratories Division of IT&T, has been appointed president of that division. **Henry H. Scudder**, Vice President of International Standard Electric Corp., overseas research and manufacturing division of IT&T, has advanced to Executive Vice President of that company.

Robert J. Smith has been elected President and General Manager of Slick Airways, Inc. Mr. Smith succeeds **D. W. Rentzel** as President, but Mr. Rentzel will remain as Chairman of the Board of Directors, a position he has occupied since October 1954.

Dr. Rodolfo M. Soria has been announced as Vice President of Engineering by the Amphenol Electronics Corp., formerly American Phenolic Corp.

Donald E. Davidson has been named West Coast Manager for Bendix International Division.

C. E. Gumbert, Jr., has been appointed Chief Engineer of the Elbecco Corp., Jackson, Mich., a subsidiary of Aeroquip Corp., and **Mathias G. Gatzweiler** has been announced as Production Control Manager at Elbecco.

W. M. Crilly, S. L. Gendler, and **Alexander M. Wyly** recently received their appointments as Staff Directors of the Planning Research Corp., Los Angeles.

Edward P. Gillane, President of Potter and Johnston Co., has been elected Executive Vice President of the Pratt & Whitney Company.

George L. Leupold has been appointed Assistant General Sales Manager of the Fulton Sylphon Division of Robertshaw-Fulton Controls Co.

Jack Marler was recently announced as Vice President of the Pacific Aircraft Sales Co., Oakland, distributors for Beechcraft.

Mrs. Sylvia Anthony Nelson, veteran aviatrix, has been named to the post of Chairman of the Board of Electronics Equipment Engineering, Inc., Dallas.

William C. Jordan and Thomas Cerny, Jr., have been elected to the Board of Directors of Summers Gyroscope Company, Santa Monica. Mr. Jordan was formerly President of the Curtiss-Wright Corporation.

HONORS

George R. Hill, Vice President for Finance and a Director of the Curtiss-Wright Corp., has received an honorary Doctor of Law degree from Rider College, Trenton. Mr. Hill is a Rider alumnus.

A. M. "Tex" Johnston, Chief of Flight Test, Boeing Airplane Co., Seattle, has been selected by the IAS as the winner of the Octave Chanute Award for 1956.

COMPANIES

Aero Design and Engineering Co. has established four overseas agents for distribution of the Aero Commander. The agencies are: Hary von Rautenkranz, Hannover, Germany; Babb SARL, Paris; Vest Aircraft de Mexico, Mexico City; and Aero-transportes Wollkopf, Buenos Aires.

The Board of Directors of the **Pacific Airmotive Corporation** has approved a revision of their existing loan agreements with the Union Oil Company of California.

AERO CALENDAR

July 7-8—Weekend flight, sponsored by Florida Aero Club, to Grand Bahama Island, in conjunction with inauguration of Grand Bahama Flying Club.

July 7-10—Tenth annual All-Woman Transcontinental Air Race, from San Mateo County Airport, Calif., to Flint, Mich.

July 8—Third annual Western New York Air Show and Races, Niagara Falls Municipal Airport, Niagara Falls, N. Y.

July 10-Aug. 9—International Aviation Exposition, Mexico City.

July 31-Aug. 9—23rd annual U.S. National Soaring Competitions, Aug. 5—Air Show, Grand Prairie Airport, Grand Prairie, Tex.

Aug. 1-5—National Convention and Airpower Panorama, Air Force Association, Roosevelt Hotel, New Orleans.

Aug. 3-5—4th Annual Fly-In, Experimental Aircraft Assn., Oshkosh, Wis.

Aug. 15-17—National Turbine-powered Air Transportation Meeting, IAS, Grant Hotel, San Diego.

Aug. 21-24—Western Electronics Show and Convention, Sponsored by IRE and the West Coast Electronic Mfrs. Assn., Pan-Pacific Auditorium, Los Angeles.

Aug. 22-24—Bendix Scintilla International Ignition Conference, Sidney, N. Y.

Sept. 1-2—Third annual Jim Long Memorial Trophy Race, sponsored by Pomona Valley Pilots Association. Starting from Brackett Field, La Verne, Calif.



JULY, 1956

Skyways

The Pioneer Publication of Business Flying

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FOUNDED BY J. FRED HENRY, 1942

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ADVERTISING OFFICE, 122 E. 42nd St., New York 17, N.Y. Tel. MU 2-9138

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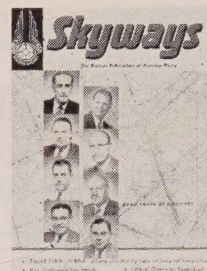
SKYWAYS is the authorized publication of
the National Business Aircraft Association.



Member Business Publications
Audit of Circulation, Inc.

VOLUME 15, NUMBER 7

SKYWAYS is published monthly by Henry Publishing Co., 122 East 42nd St., New York, N.Y. Printed in the U. S. A. Single copy, 50c. Subscription Prices: U. S., Possessions, Canada and Pan Am. Union, \$9.00 for 3 years, \$7.00 for 2 years, \$4.00 for 1 year; all other countries add \$1.50 per year for postage. Please give title, position and company connection when subscribing. Six weeks required for address changes (give both old and new). Manuscripts, drawings, other material must be accompanied by stamped, self-addressed envelope. SKYWAYS is not responsible for unsolicited materials. Accepted as controlled circulation publication at Bristol, Conn. Copyright 1956 by Henry Publishing Company. The following publications are combined with SKYWAYS: Air News, Flying Sportsman and Airways Traveler. All rights to these names reserved by Henry Publishing Co.



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Here's why the Beechcraft Bonanza can do more for you than any other single-engine business airplane:

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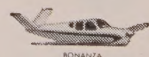


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the sky

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Beechcraft

BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS



BONANZA



TWIN BONANZA



SUPER 18

Editorial

WHAT EVERY CONGRESSMAN SHOULD KNOW

Your Congressman will have no quarrel with financing reasonable planning and experimenting—with the perfecting of improvements for tomorrow's air traffic control and for future navigational and communication needs.

He will consider it his responsibility to O.K. full speed ahead to test and perfect *Sage*, or other automatic systems, to keep on trying to determine if *Tacon* is preferable to VOR/DME and whether or not *Tacan* will really work; to putting radar to critical tests. He knows that these things, and others, may turn out to be needed improvements.

Your Congressman fully realizes that improvement and change are essential ingredients of progress and that progress must not be stifled.

Additionally, your Congressman knows that these things should not keep us from meeting today's minimum requirements.

It is not too evident, however, that your Congressman understands that perfectly usable and badly needed equipment now on hand is going unused!

Your Congressman should fully understand that today—in July, 1956—air traffic density demands that we use every tool presently available and readily at our disposal. Does he fully appreciate that we are failing today to do everything within our power to protect airborne lives by refusing to use 190 DME stations which are bought and paid for and available for use?

Does your Congressman know that not next year—nor two nor three nor five years from now—but today—our common air system cries for a uniform method of electronically—instantly—having a positive airspace fix for every aircraft flying in instrument weather?

Does he know that equipment to make this possible is not only on hand but is actually on sites? Does he realize that this equipment has been bought and paid for with Taxpayers' dollars—with full approval of the Congress of the United States—has been proved by thousands of hours of use, is more accurate than a skilled pilot can manually fly? Does he know that such equipment is not being used? Does he realize that this is true while we are crying about congested airways and high density traffic in many landing areas?

Your Congressman is fully aware that as a mode of transportation, Aviation is young. He knows that, up to now, we have witnessed—if, indeed, we are not still witnessing—only its formative and adolescent stage. But he also knows that Aviation is on the march. He is fully aware of the increases in hours flown, in passengers carried, in planes bought during 1955. Down deep within, your Congressman fully expects, within a few tomorrows, to see and feel Aviation's vibrant maturity.

Your Congressman is at least vaguely aware that the day may already be dawning when mass acceptance will make flying the principal means of competing with—if not conquering—man's age old enemies of time and distance. He must clearly see that when that day arrives, mankind will realize its greatest emancipation.

Your Congressman wants to do his part in planning to minimize all the myriad complications such a day will bring. But, in doing so, it is very doubtful that he wants to lose sight of today's needs—interim as they may be.

Your Congressman may not fully realize that unless today's airspace needs are met, we face the needless loss of human life, we may stifle the expansion of commerce, we may fail to keep ahead of those who seek to destroy us—we may even seriously hamper our means of defending ourselves.

Let your Congressman know that VOR/DME should be put to work; that it is wholly unnecessary for a military jet to be 60 miles away before its pilot can advise ATC where he is in airspace. Tell him that no airliner in instrument weather need have wrapped around it a cocoon of air 100 miles long, twenty miles wide and 2,000 feet thick. Tell him of our congested airways and our need to efficiently utilize our air ocean.

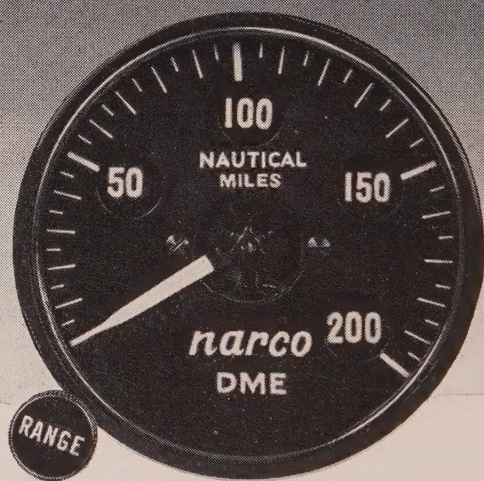
When your Congressman asks you why there has not been a greater demand for DME, tell him that the demand is not proportioned to the need for the simple reason that official Government statements have kept aircraft owners from making investments in and from using DME because of the announced intention to "kill" DME—some day (1960 at the latest)—"if" *Tacan* happens to work!

Ask your Congressman to be sure and read House Report No. 737 of the Committee on Government Operations, 84th Congress, 1st Session, dated June 8, 1955, covering "Military Procurement of Air Navigation Equipment." This is something every Congressman should know!

DME



Ready TODAY for the Jet Transports of TOMORROW



The CAA Distance Measuring system is in full operation on virtually every major Federal Airway, providing pilots with information they have always wanted, never had—distance from a radio fix, as well as direction.

Hundreds of airline and executive aircraft use this navigation system daily—expediting IFR approaches, taking the guesswork out of position reports. The majority of these aircraft are equipped with Narco DME.

Narco Distance Measuring Equipment meets CAA specifications for airline use, is completely proven, accurate, reliable. It is in full production.

VOR/DME is ready TODAY for TOMORROW's era of jet transport, which will require the precise type of navigation provided only with *Distance Measuring*. It is ready, too, for TODAY's business and airline aircraft.

Narco DME gives pilot precise distance from VOR/DME or ILS/DME stations in nautical or statute miles on one of two scales selected by "range" knob—0-20 miles; 0-200 miles. Permits quick, accurate, continuous check of ground speed, expedited straight-in approaches, positive position indication at all times. Completely detailed brochure available.

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New Gulfpride Aviation Series "D"



How Business Aircraft Can Simplify Company Operations

Outstanding safety policies and efficient organization pay off in sales and promotion of Sprague Electric Products



Jean H. DuBois

The Sprague Electric Company of North Adams, Massachusetts, is well aware that airplanes save time. Sprague officials can leave their offices during the regularly scheduled working hours, complete their business in distant cities and return in time to plan the next day's work. By using Company aircraft, hours of fatiguing driving, waiting on train and airline schedules, and loss of unproductive time, are considerably reduced.

Three of the four Sprague aircraft are conveniently hangared at the Hariman Airport, only a short distance from the North Adams plants. Due to the local terrain it is impossible to make instrument approaches at North Adams. Therefore, one Twin Engine aircraft is normally based at Albany, New York, thirty-two air miles from North Adams. These planes also are a great "Boost" to the promotion and sales of Sprague Electric Products. Whether they are used to conserve travel time for busy executives and other personnel, to increase efficiency in contacting out-of-town plants, to speed members of the Sales Depart-

ment to appointments with prospective customers, to rush light equipment to a distant point, the Company-owned and operated planes contribute immeasurably to smoother internal operation and more effective sales policies.

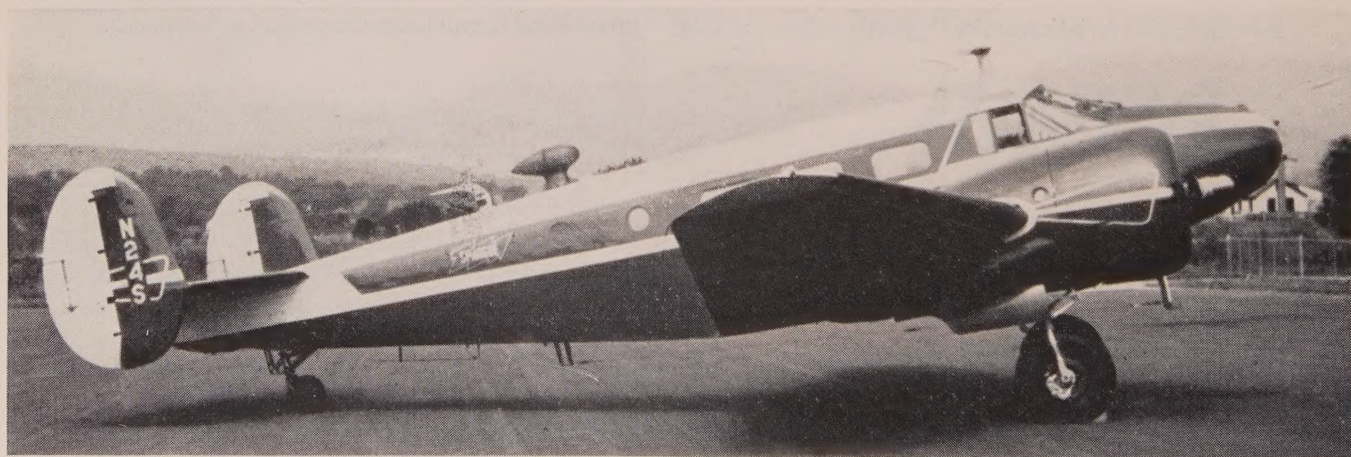
Let's take a typical example of Sprague's flight operations. A telephone rings in the Flight Department office. A New York customer urgently needs a shipment of Sprague Electric capacitors. It is late Friday afternoon, making it difficult to send the shipment by truck since the customer has stressed the importance of receiving the item as soon as possible. Does the Flight Department help this anxious customer?

The Flight Department certainly does help and effectively meets the situation with Company aircraft. Although it may take several flights to do it, the shipment is flown to New York in the Company planes. The delivery was prompt and the customer is satisfied. Once again, aircraft proved their time-saving value to the Sprague Electric Company by simpli-

fying another of their operations.

As a leader in the use of airplanes for business, as well as in the Electronic and Electric field, Sprague has been operating its own aircraft for many years. Even in the late 1920's the Company owned a Stinson and used it extensively for business. But it wasn't until the purchase in 1951 of a Navion and the hiring of a pilot to fly it that Sprague's Flight Department was formally established. Today, the all Beechcraft fleet consists of three multiengine and one single engine aircraft—a D18S, two C-50 Twin Bonanzas, and a B-50 Bonanza. Six skilled and experienced pilots are on call to operate them.

Whenever a maintenance problem arises in a branch plant, it is only a matter of minutes before key maintenance personnel are on the scene of the trouble and at work correcting the situation. Sometimes production is hindered by shortage of essential materials, but is swiftly alleviated by flying the needed materials from the producer to the plant, or between branch plants.



With aid from the Flight Department, Sprague has found it practical to operate branch plants throughout New England and New York State without having to maintain extensive Employee and Community Relations, Engineering, Payroll, Methods, Time Study or similar departments in each plant. Personnel from the main North Adams office are able to cover a large territory in a short time.

Sprague officials are quick to assert that aircraft save time and contribute to better coordination and efficiency of company operations. But they never compromise aircraft use at the expense of safety. Both the flight crew and planes must live up to an exacting set of standards.

To assure the safety of passengers and pilots, numerous safety precautions and procedures are observed. Each pilot is required to have a flight check ride every three months and a three hour instrument ride every month. Single engine aircraft flying under instrument conditions, even when a possibility of instrument conditions exists, is not permitted. Pre-flight and daily inspection reports are filled out by each pilot prior to using an airplane. A general check of each plane is conducted frequently by a certified mechanic at the Harriman Airport.

When carrying passengers, no single engine aircraft is flown at night. Company pilots, however, are required to make at least five take-offs and landings at night during each 90-day period in preparation for a possible emergency. Planes are always operated at safe altitudes and pilots must use a check list before starting the plane, taxiing, take-off, after take-off, and before landing.

The safety of Sprague passengers is considered of first importance. Smoking is prohibited when a plane encounters rough weather, as well as during take-offs, approaches, landings, or on the ground. Electrically operated cigarette lighters are installed to prevent any remote possibility of an explosion of lighter fluid. In further interest of safety, air routes are prescribed for all flights, following the least hazardous terrain.

To encourage safe operating procedures in the area, Sprague has made available a VHF Unicom at Harriman Airport for all aircraft operators to use, enabling them to make radio contact with the airport on the prescribed frequency of 122.8 megacycles. VFR flight plans are filed by Sprague pilots with the CAA for all flights over 50 miles, and on longer flights (exceeding 90 miles), they must report their position every 60 miles to the nearest CAA radio facility.

Company aircraft operations are the responsibility of NBAA board member Robert C. Sprague, Jr., Director of Employee and Community Relations and Chief Pilot. Mr. Sprague is a long-experienced pilot, and holds single and multi-engine land, commercial, instructor and instrument ratings. He often flies or check-rides the Company planes to insure that they are being operated under even higher safety minimums and operating procedures than established by the Civil Aeronautics Administration. The Sprague Flight Department has earned an enviable name for itself in industry and the aviation world because of its outstanding safety policies and efficient organization.

An exceptionally complete comprehensive "Flying Policy Manual" is issued to each pilot and interested staff officials. Regular revisions and additions are distributed to all concerned directly from Mr. Sprague.

Each company pilot is held responsible for thorough knowledge of the contents of the Flying Policy Manual and for all revisions which are issued. There is no room for confusion or doubt about any procedure since every phase of flight operations is clearly spelled out in the manual.

Manual contents include: Index Instructions and Outline of Policy Numbering, Method of Filing, Distribution, Accidents, Auto Pilot, Check Rides, Costs Accounting, Equipment, Engines, Emergencies, Flight Plans, Health, Instrument Flying, Inspections, Insurance, Maintenance and Mechanic, Medical, Night Flying, Policies, Pilot, Routes Rules and Regulations, Reports, Safety, Flight Schedules, Smoking, Take-offs and Landings and Training. Each of the above headings has an alphabetical and numerical listing with one or more pages covering that subject.

In addition to Robert C. Sprague, Jr., the Company has five well-qualified pilots. Three of these men devote themselves exclusively to the pilot-

ing and care of the ships. Two others are reserve or stand-by pilots engaged in regular work in the Employee and Community Relations Division.

William G. "Bill" Benedetti, an ex-Navy Lieutenant, who piloted fighters and dive bombers during World War II, was the first pilot hired by the Sprague Flight Department in 1951. He holds a commercial certificate, single and multi-engine land, flight instructor and instrument ratings. Bill is Manager of the Flight Department which reports to Mr. Sprague.

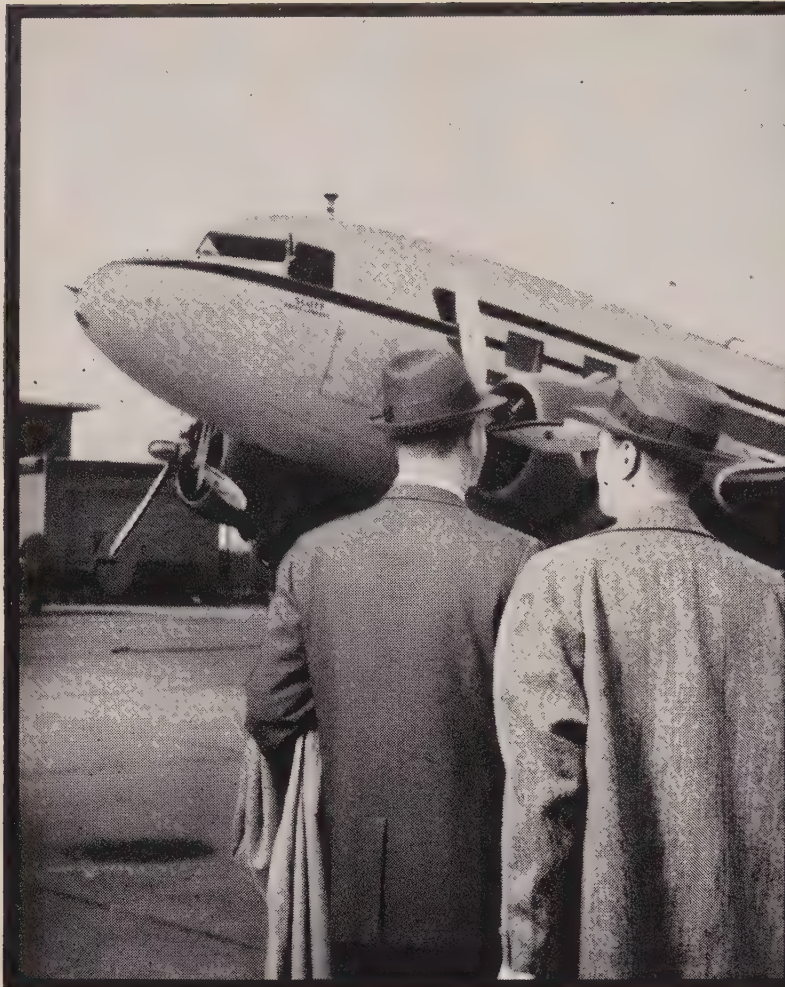
Frederick Whitham served as both co-pilot and pilot in a B-17 in the European Theater of Operations during World War II. Fred also has a commercial with single and multi-engine land and instrument ratings. He was the second pilot hired by the Company and is now Manager of the Company's Wage and Salary Administration Department of the Employee and Community Relations Division.

John J. Gumbleton resigned his Air National Guard post to join the Flight Department as a full-time pilot. He had been flying F51's, F84's and C47's, and holds a commercial, single and multi-engine land and instrument ratings. John is now assigned as a reserve pilot and works with the Company's Training Department.

Vassily deSamsonow is a long-experienced pilot with many hours of flying. A certificated pilot since 1939, Mr. V. deSamsonow joined the Royal Air Force at the outbreak of World War II. He served five years as a first pilot and flight testing officer. He holds a current Airline Transport Pilot Certificate and is a CAA designated Instrument Flying Examiner.

Page B. Clagett joined the Sprague Electric Company in November 1955. For the preceding four and a half years he flew in the U.S. Naval fleet Logistics Service as a first pilot and plane commander in Lockheed Constellations, and Douglas DC-3 and DC-4 aircraft. He held the rank of Commander. He is a past Senior
(Continued on page 48)





The Scott Paper Company plane, insured by North America

Extra Value makes the difference in Aviation Insurance

Standard clauses in aviation policies make all insurance seem the same. Below the surface there are differences worth considering. North America Companies' differences stem from the extra value furnished with the policy.

North America, as the leading independent underwriter of private plane insurance, has the *Capacity* to meet any underwriting need. It has *Coverage*, plus the pioneer spirit it takes to adapt policies to situations. In *Service* North America, the leading independent insurer, is free to

develop beyond standard accommodations. Its 102 claims offices provide quick processing of claims. Any of its 20,000 agents can quickly get a North America aviation specialist—one of its own—to your side. Periodic inspection of craft is a valuable safety feature available to our policyholders without charge.

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COMPANIES

Philadelphia

Windstream Analysis for Pressure Pattern Flight

By Robert K. Polson

Meteorology courses for pilots, during the early years of World War II, failed to cover adequately the construction and interpretation of the upper air *constant pressure charts*, commonly known and referred to as *Millibar Charts*. As a consequence, a number of pilots are unfamiliar with the form of data presentation, and the value of these charts for flight planning. The advent of pressure-pattern flight, in which the wind field is made an accountable factor in track selection in order to secure a more favorable flight time, dictates increased interest in the constant pressure charts. Although a solution directly involving pressure is not advocated in the subsequent article on "Minimum-time track construction," an understanding of the relationship of pressure gradient to wind is essential in recognizing the situations which are conducive to that technique, and in making track selections to professional standards.

Actual millibar charts are drawn every 12 hours from observations of pressure, temperature, and wind taken simultaneously over the North American continent, and are issued from Washington by "facsimile" transmission after a construction delay of 2½ hours. The charts are labeled in Greenwich Mean Time according to the hour of observation beginning at 0300 GMT, and are available in approximately 100 major weather offices in the United States. Forecast charts, termed prognostic charts, or "prog charts," are also drawn for certain levels every 12 hours. Heights at which the various millibar pressures occur in standard NACA atmosphere are as follows:

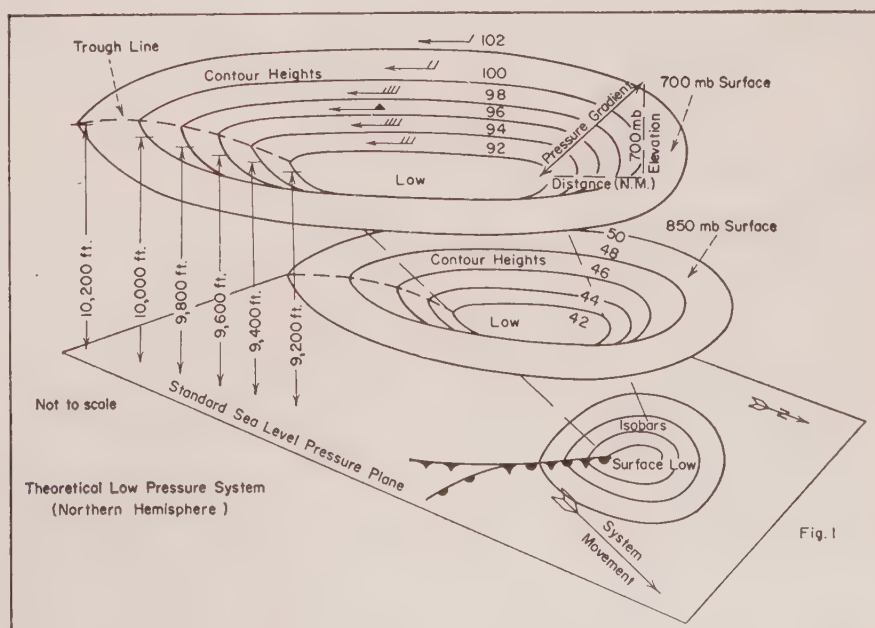
Pressure	Corresponding Height
1000 mb	364 feet
850 mb	4,780 feet
700 mb	9,879 feet
500 mb	18,281 feet
300 mb	30,053 feet

The 700 and 850 millibar levels are of most interest to the executive pilot

because of their proximity to common flight altitudes. The presentation of pressure information on these charts differs considerably from that of insobaric surface maps, in that millibar charts do not directly record the pressure existing at a given level. The 700 mb chart represents the undulating surface formed by the absolute height in feet at which 700 millibars of pressure actually occurs above the standard sea level pressure plane at various points. Figure 1 is a three dimensional view of a theoretical low pressure system, illustrating the 700 and 850 mb surfaces, and the associated low at sea level. If an aircraft altimeter were set to 29.92, and the aircraft flown at an indicated altitude of 9,879 feet (the standard 700 mb level), it would descend to 9,200 feet at the center of the low, and begin climbing the slope on the other side to the plateau elevation of 10,200 feet above mean sea level. Such a procedure would constitute flying a constant 700 mb surface. It is this surface that is depicted on the 700 mb chart. This slope, or gradient, is responsible

for the term "gradient wind," the computed equivalent to the actual wind. In theory, gradient wind is not a constant-altitude wind, but occurs along the changing elevation in the millibar surface. In practice, it is usually considered valid for several hundred feet vertically on either side of the surface. The pressure gradient, or slope, is the outstanding feature of millibar charts, and is shown by the heavy lines of constant pressure height, or lines of equal *contour height*. These lines, drawn for every 200 feet change in the elevation of the millibar surface, are interpreted in the same manner as contour lines on a conventional terrain map; low pressure areas being depressions in the millibar surface, a high pressure area appearing as a mountain of air, trough lines taking the form of valleys, and the line of highest pressure being known as a "ridge line."

Geostrophic wind, except for latitudes within 20° of the equator, is said to blow parallel to the contour heights and inversely proportional to (Continued on page 43)



By the Numbers . . .

by Bill Lawton

Carroll D. Heath, the CAA man in Washington who issues aircraft registration numbers, admits he has more "unusual headaches" than he does "unusual experiences" when it comes to answering requests for special number-letter combinations for private, business-owned and commercial airline ships.

Heath, as Chief-Administrative and Records Branch of the CAA, can cite many peculiar and unusual reasons why airplane owners want a special number. The one that about tops them all happened only a short time ago.

It was a long-distance call that Mr. Heath took himself. The caller sounded desperate.

"Thirty thousand dollars hangs in the balance," the caller shouted. "He must be nuts. He won't buy the airplane because the numbers add up to thirteen. Do something, Mr. Heath, do something!"

"What number do you want?" asked Heath.

"Any number. Any number at all. Just so it adds right."

The airplane seller and number-minded buyer were quickly treated to a combination more satisfactory.

Most aircraft owners are content with the number that comes with the aircraft. However, it is the owner who, for diverse reasons, wants a special number that keeps Mr. Heath's group hopping.

When the \$10 fee for special numbers was introduced several years ago, Heath thought that it would discourage the "numbers players." Instead, business boomed.

"The ordinary guys thought the fee was reasonable," Heath said, "but the auditors of some of the big corporations called it an outrage."

By far the most sought after number is N 1 A.

The Nogales International Airport thought it needed the number for its aircraft.

One man claimed he was entitled to it because his wife's name was NIDA.

Most persons just asked for it on general principles.

All these applicants were out of luck because the Goodyear Tire and Rubber Co. obtained N 1 A in 1946 to register one of its L-type blimps.

There are several famous aircraft

now bearing the N 1 number . . . and probably the best known along the Eastern seaboard is N 1 M, Arthur Godfrey's DC-3.

Godfrey didn't care to comment on the significance of the One Mike designation, but then, how else would the world know about the popular redhead, if it wasn't through the medium of one mike?

Executive aircraft owned by corporations offer some interesting case-histories.

Last year, when L. B. Smith Aircraft Corp. at Miami International Airport wanted a special number for their newest executive DC-3 conversion, the "Tropicana," they requested and got N 1956.

They asked, "What could be a more appropriate number for the most modern DC-3 executive ship which incorporates the newest forward look?"

For instance: What would be the logical number for the Parker Pen Co.'s two ships?

Right: 51 A and 51 B for their DC-3 and *Twin Bonanza*.

More often than not corporations can't get exactly what they want. Esso Standard Oil Co., for example, tried to get numbers ending in "SO." This was ruled out because of the possible confusion between zero and the letter O. Coca Cola tried to get some 5 C numbers to advertise 5-cent Cokes, and Pillsbury thought some 4 X numbers would be nice, but these were already spoken for.

The Coke people now fly their executive DC-3 with the N 4 C registration. Maybe four-cent Cokes are on the way?

More fortunate was the Minnesota Mining and Manufacturing Co. which was able to get N 3 M for their first DC-3 and N 33 M for their second DC-3. N 23 M is assigned to their *Lodestar*.

Minnesota Mining's newest DC-3 executive ship, now getting the finishing touches at L. B. Smith Aircraft Corp.'s Miami hangars, will most likely have N 43 M for its registration number.

"Most people have a sensible reason for wanting a special number," Heath says.

"There was, for example, the man who explained that his memory for numbers was bad ever since he was

a child. He wanted a special number which was the same as his street number. He's been living at the same address now for 10 years, and he thought he could recall the number without too much trouble."

The Procter and Gamble Co. at Cincinnati, Ohio had a special reason for their request. Their DC-3's are numbered N 3 PG, N 4 PG, and N 5 PG. Similarly the Texas Gas Transmission Corporation, Owensboro, Kentucky had their DC-3 numbered N 40 TG.

Outboard Marine and Manufacturing Company, Milwaukee, has their ships numbered N 9 OM, N 8 OM and N 77 OM, so that the OM carries the Outboard Marine characteristics.

Some people will go to surprising ends to get a special number.

One man, Heath recalls, sought in vain to get a particular number assigned to his aircraft. He was repeatedly told that the number was in use.

One day the telephone rang in Heath's establishment and the man was on the phone again.

"Have you heard the news?" the man wanted to know. "N so-and-so just crashed and burned. Now . . . can I have the number?"

The girl who took the call was horrified.

"Imagine it," she said. "We didn't even have the accident report yet ourselves."

Sometimes there's a little history attached to the request for a special number.

Many years ago, Clint Murchison, Sr., of Dallas, Texas adopted the 7 L brand for his cattle. When it came time to select a number for one of his company's aircraft, the N 7 L was a logical choice. Fortunately, it was available.

A neighboring Texan, Sid Richardson, flies in a DC-3 piloted by Ed Armstrong, who has a whimsical turn of mind. Ed calls the tower these days with "Two Two Tango" as his ship's call sign. N 22 T is the registration, and you can take your choice of what airway alphabet code you use.

Airlines frequently request a block of numbers to help their personnel to readily identify the type of ship assigned to schedules. American Airlines obtained a block of numbers in
(Continued on page 47)

PLANE FAX

by STANDARD OIL COMPANY OF CALIFORNIA



13,000 channel crossings in two years

Flying the world's shortest airline run, Dick Probert's Avalon Air Transport planes average 17 minutes a flight over the 32 miles between Long Beach, California, and Avalon Bay on Catalina Island. The route is one of the world's busiest, too, with up to 47 flights a day, and a total of 13,000 crossings and 75,000 passengers carried since the first flight in August of 1953.

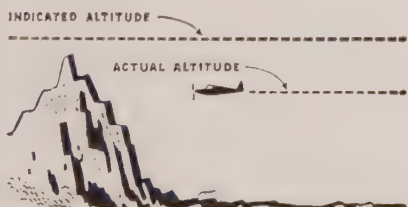
"The open sea is one big airport for our Grumman G-21's," says Mr. Probert, "so our over-water flights hold few dangers. But they really give our 450-horsepower

Pratt & Whitney's a workout. Long, full-throttle water take-offs, short flights, salt-water spray on the engines; they all call for the best possible lubrication. We get it, too—RPM Aviation Oil gives us 1100 hours between overhauls. And the engines are in good condition even after that time; we overhaul them just for preventive maintenance.

"Another problem we have is very high head temperatures because of our water take-offs. But Chevron Aviation Gasoline 80/87 prevents detonation, and gives us full power when we need it. Never fouls plugs, either."

TIP OF THE MONTH

It's not true that a pressure altimeter always gives actual altitude in flight. Temperature, outside pressure changes, etc., can cause errors as much as 2000 feet in altitude reading.



*We take better care
of your plane*

T.M.'s "RPM," "CHEVRON," "PLANE FAX," REG. U. S. PAT. OFF.



JULY 1956

Mayo Hotel
Tulsa, Oklahoma

Why business pilots need disability loss of income insurance

This particular round table of SKYWAYS is a departure from the usual round table in that we are considering a subject covering an action already taken by The National Business Aircraft Association (NBAA) and therefore one which is an existing fact. It might be well to term this discussion an informative round table. The purpose is to make available the results of an insurance study which the NBAA Board of Directors has made, extending back about eighteen months. It was NBAA's intent to provide a type of insurance coverage for the pilots of member companies which would indemnify them for losses that might be sustained by virtue of disability resulting in loss of a CAA medical certificate.

H. W. Boggess, President, NBAA

Moderator Henry W. Boggess, (Aviation Director of Sinclair Refining Co.): Present at this round table are individuals very well qualified to answer questions on our subject and, I am sure, some who also are well qualified to ask questions. I would like first to call on a gentleman with whom the Board has worked for many months in developing the type of insurance coverage which we felt our member pilots were most anxious to obtain. Mr. Bill Vance, would tell us something in general about the coverage provided by the new NBAA policy.

William R. Vance (Manager of Aviation Department, Rollins Burdick Hunter Co.): Thank you, Mr. Boggess. I believe that we are faced with a problem that to the NBAA member pilots or other business pilots is unique. Today, there are thousands of various size companies and corporations owning and operating aircraft. Obviously, each corporation usually has some type of benefit for their employees, depending on the size of the organization. Consequently, we had to come up with a program that would offer a rather broad range of income protection and at the same time would provide a variable waiting period to fit in with whatever sick leave benefits a corporation might have, if any. Therefore, we decided it

would be impossible to accommodate the needs of every business pilot employed by a corporation. What we attempted to do, and I think with some degree of success, is to set up a low cost group insurance program which we feel will hit within the range of at least 90% of the pilots. Certainly the remainder can find some type of coverage that will meet individual needs. The NBAA group coverage is broad, of course, in that it protects the pilot against loss of income for any reason other than deliberate acts. The weekly indemnity benefits provided are adequate to protect the majority income of pilots flying for corporations, and I believe the waiting periods have been designed to pick up the average corporation's sick leave benefits. The waiting period varies from 30 days to 180 days, with options in between. I feel that this fairly well outlines what the overall program is designed to do. Perhaps now it might be a good idea to fire questions my way.

Henry W. Boggess: Thank you, Mr. Vance. We have with us one of our member company pilots who served on the NBAA Special Insurance Committee by doing most of the initial leg work in developing this coverage. Mr. Vic Swanson of Sears and Roebuck, would you care to comment on the merits of this particular group coverage?

J. V. Swanson (Chief Pilot, Sears, Roebuck and Co.): Yes, Mr. Boggess. I believe it was almost 18 months or two years ago that we started to work on a plan of this nature. I was so much in favor of insurance of this type that I took out an individual policy while our NBAA policy was being developed. I am convinced that this type of policy takes the emergency aspect out of a sudden loss of medical certificate and income, and gives a pilot an opportunity to put his house in order without being under emergency procedures. He can have at least two years to decide whether he is going to continue in aviation in another capacity, or possibly train for a different position. Meanwhile, he is assured that his income will in the interim continue as though he were still working in his original job.

Henry W. Boggess: Do you find, Mr. Swanson, that the premium for this type of group coverage is less than that of an individual subscriber?

J. V. Swanson: Yes, there is considerable difference in a policy taken out on a group and an individual basis, both in premium payment and in coverage.

Henry W. Boggess: Do you mean the group coverage is more comprehensive and that the premium is lower?

J. V. Swanson: That is right, especially in the NBAA

plan. In an individual plan, you are not covered to as late an age and your temporary benefits are far less desirable than those in the group plan.

Henry W. Boggess: *Thank you very much, Mr. Swanson. Now, let's get down to cases on NBAA's particular coverage. Mr. Vance, this policy covers four types of waiting periods, so that the individual pilots for any corporation may fit the premium and waiting period into his own company disability coverage. One waiting period is for 30 days, another is for 60 days, at a lower premium. The policy has the same benefits even though the waiting period is twice as long. Then there is a 90 day waiting period, and a 180 day waiting period, with even lower premiums. Vic, do these benefits fit the individual policy that you had written?*

J. V. Swanson: There is no flexibility. In fact, the individual policy usually follows a rather set pattern. You only have a choice of the amount you want to carry. You might be able to offer some corrections, Bill.

William R. Vance: The majority of the individual contracts, I believe, have been written around a principal amount of insurance, such as \$10,000 or \$15,000. Normally, these policies have been restricted to a \$15,000 maximum. It is only written in London, which, from the claim servicing viewpoint, might be difficult if you had a large number to handle, particularly servicing the weekly indemnity benefits. There is a selection provided, however, that you can take the \$10,000 or \$15,000 principal sum and have that correlated into a monthly income spread over a period of years until the coverage is exhausted.

Henry W. Boggess: *So far as the waiting period is concerned, it is standard, leaving no choice?*

William R. Vance: There has been none at all established on the individual policy.

Henry W. Boggess: *Would you say, Vic, that the NBAA sponsored group disability policy, having variable waiting*

periods which may be chosen by the pilot, is an improvement over the individual policy?

J. V. Swanson: Definitely, yes. I think it would be reasonably compared to going out and buying your own health and accident insurance when your company offers you a group plan with better coverage and lower premiums.

Henry W. Boggess: *Another point that we might bring up for discussion at this round table is the comparison between the individual policy and group policy with reference to the attained age when the benefits payable begin to go downward. For instance, in NBAA's group policy at the age of 51 years, you would get 90% of the applicable amount for which you applied. Each successive year, through age 59, benefits decrease 10% per year. In an individual policy, what is the age at which full coverage begins to decrease?*

J. V. Swanson: Under my individual policy, I'm not covered after age 50. In the individual contracts, normally the graduated amount begins at age 41, and after 50 there is no coverage available.

Henry W. Boggess: *In other words, while in your individual policy you have 100% coverage at age 40, you would have only 10% at age 49, and none after age 50?*

William R. Vance: Mr. Boggess, I would like to correct one thing that might be misconstrued. The reduction in weekly benefits after age 51 in the NBAA policy applies only to sickness, and not to accident or injuries.

Henry W. Boggess: *I think that is a strong point. It probably is not necessary to read the policy and its individual coverage. Each of you around the table has a resume in brochure form of the policy coverage. I would like to call your attention to two particular points. Where in the brochure regular members are mentioned, the word should be active members. Actually, NBAA has, according to its constitution and by-laws, two classes of members: regular members and associate members. The bro-*



DISCUSSION of NBAA loss of income insurance was attended by (L to R, seated) William Vance, Rollins Burdick Hunter; Henry W. Boggess, President, NBAA; Clarence Sayen, APA; Hal

P. Henning, General Motors; (L to R, standing) Jean DuBuque, NBAA; S. P. Johnston, Johnston and Co.; Penn Wilson, Carter Oil; and J. V. Swanson, Sears, Roebuck and Co.

chure will be amplified by questions and answers to make it clear that this insurance coverage is not limited to regular members, but covers associated members as well. Is that correct, Mr. Vance?

William R. Vance: That is correct.

Henry W. Boggess: Another point that I would like to call to your attention is in the second paragraph on the second page of the brochure. The amount of weekly benefits as stated in this paragraph will be limited to the amount of the reduction in regular salary resulting from change in the pilot's physical condition and his type of medical certificate, but not to exceed the amount of weekly benefits he selects. Actually what is being referred to in that particular section is a pilot who has an ATR rating and for some reason is unable to qualify for a first class medical certificate. If the best he can obtain from a CAA medical examiner is a commercial certificate, which is a second class physical, and if his salary is reduced because of the lower medical rating, he can be indemnified only for the difference between the loss in his salary. This does not mean that if he loses his airman's medical certificate and is not permitted to fly at all, but has other income, that this insurance is not payable. He will be paid in full regardless of what he may earn on the outside as long as he cannot fly. Is that correct, Bill?

William R. Vance: That is correct. I believe there is one exception, however, that might be clarified, and that is in the case of a supervisor or chief pilot of a corporation whose duty doesn't normally require him actually to fly an airplane.

Henry W. Boggess: You mean one who is not employed in a flying capacity?

William R. Vance: He does fly the majority of the check flights, which amount to only a few hours a month.

Henry W. Boggess: Not if he doesn't have a medical certificate. It's not legal.

William R. Vance: I mean provided the supervisory pilot is a currently rated pilot. He has to fly a few hours a month to keep his ratings active.

Henry W. Boggess: In that event, he would be likely to have a commercial certificate.

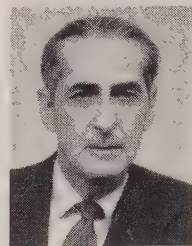
William R. Vance: That is right. And if he was then unable to pass his first or second class medical examination, but retained his position in a supervisory capacity, possibly with a reduction in salary, benefits payable would be only the actual loss of income suffered, or the difference between his former and present salary.

J. V. Swanson: I have a question about this point. Let's say that he is a pilot and flying is his principal job with the company. If he loses his medical certificate temporarily, and his company decides to keep him on in charge of crew schedule but at a salary only 75% of what his initial flying pay would be, is he covered?

William R. Vance: He is, Vic. The underwriters would pay the difference in his loss of salary, not to exceed, of course, the amount of indemnity he had purchased.

Clarence N. Sayen (President, Air Line Pilots Association): If this man is injured and collects under his

ROUND TABLE PARTICIPANTS



HENRY W. BOGGESS, Moderator, is President of the Board of Directors of the National Business Aircraft Association, Inc., and Director of Aviation, Sinclair Refining Company. He has specialized in the management phases of aviation for many years, and organized Sinclair's Aviation Department. Mr. Boggess is a member of the American Society of Safety Engineers.

JEAN H. DUBUQUE, Executive Director and Secretary of the National Business Aircraft Association, has been active in aviation for more than twenty years. He is a member of the IAS and QB's.

WILLIAM R. VANCE, Manager of the Aviation Department of Rollins Burdick Hunter, served previously with the Aviation Department of the Insurance Company of North America. He entered the Air Force as pilot; served eighteen months in the Air Force during the Korean situation.

J. V. SWANSON, Chief Pilot for Sears, Roebuck and Company.

PENN WILSON, Chief Pilot for Carter Oil Company, has been flying since 1935, and was with ATA in England and RAFTC.

HAL HENNING, Operations Manager for the Air Transport Section of General Motors, has been an active pilot since 1925. He is a member of SAE, IAS and Wings Club.

S. P. JOHNSTON, JR., President of Johnston and Company, Inc.

CLARENCE N. SAYEN, President of Airline Pilots Assn.

Business
Pilots'
Disability
Insurance



AMEL CREDIT COMPANY
OF PHILADELPHIA, PENNSYLVANIA

policy for say eight or nine months, and then recovers and goes back to flying and the injury recurs, is his policy reinstated in full for the remainder of his policy period?

William R. Vance: What I think you are referring to, Mr. Sayen, is the recurrence of the same injury or disability. If the time period is of sufficient length, and the same injury recurs within the same year, it can possibly be construed as continuous. However, after a sufficient number of months have elapsed, it might be considered as a new claim.

Henry W. Boggess: If it is a recurrence of a disability which has an interim period of going back to work before the recurrence, are you saying, Bill, that the maximum amount is exhaustible, once the benefits equal the maximum amount covered?

William R. Vance: Yes, if it results from one injury or
(Continued on page 36)

EXPERIENCE...



THE LOSS OF License Insurance plan discussed in this issue of *Skyways* was developed for the *National Business Aircraft Association* by Rollins Burdick Hunter Co.

This is one of the many specialized services we provide within the aviation field. These include servicing the insurance and loss control needs of owners of business aircraft, air lines, aircraft servicers and manufacturers of aircraft and aircraft components.

Hubert J. Lohr

Chairman



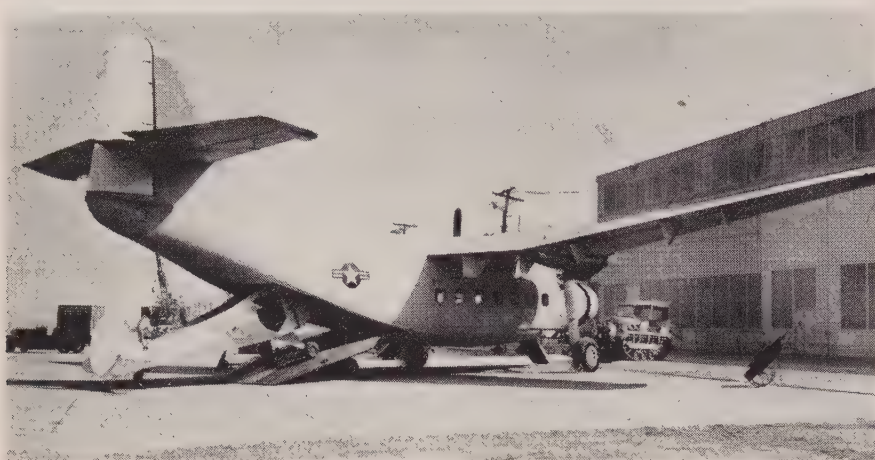
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SKYWAYS FOR BUSINESS

News Notes for Pilots, Plane Owners Operating Aircraft in the Interest of Business



Modified Northrop 125D Trimotor Becomes Jungle Air-Lumber-Truck

Miami, Fla. The first of 18 Northrops to be converted from 1200 H.P. Wright 1820-99 engines to 1350 H.P. Wright 1820-56 engines with single or two stage blowers by Frank Ambrose Aviation Company of Miami, Florida, is assigned to haul lumber and logs from an improvised landing strip at an 8500-foot altitude on a Mexican mountain.

Two factory production Northrops were equipped with 1425 H.P. Wright 1820-101 engines, which are not available in the surplus market because they are current production. As a compromise, the Wright 1820-56 is between the 1200 H.P. and the 1425 H.P. engines.

Triplay Y Maderas, of Durango, Mexico, lumber mill operators, will be the first to attempt an operation of this kind. The thirty-minute flight from the mills to the seacoast will replace the several days required for trucking on dirt roads for distances over 350 miles around mountains and valleys. The roads are almost impassable during the rainy season.

The Northrop will carry 10,000 pounds of lumber to the coast, and 14,000 pounds of machinery, fuel oil, and supplies back to the mills.

The Northrop's hydraulically operated ramp for fast loading and unloading combines with the safety factor of three engines and short take-off and landing characteristics to make this type of operation feasible.

Other modifications to the aircraft include the removal of thermal de-icing system heaters and ducts, excess wiring, oxygen equipment, streamlining, etc. The sealing of the wing leading edge intake ducts and exhaust openings at the wing tips, combined with the 450 H.P. increase in power, have increased the controllability and cruising speed of the airplane by more than 25 m.p.h., and the overall performance characteristics show a remarkable improvement. The empty weight has been reduced to 25,000 pounds, and it is estimated that it can be further reduced to less than

24,000 pounds. It is estimated that the Northrop will climb on any two engines at sea level with a useful operating load of 18,500 pounds. At 38,000 pounds gross weight the plane has an estimated ceiling of 19,000 feet, and 11,000 feet with the propeller of one engine feathered.

Piper Sets Up Service Training School As First Step in New Service Program

Lock Haven, Pa. Piper Aircraft Corporation has launched a program to establish a network of factory certified service centers. Under the direction of Rolland Boardman, Piper Service Manager, a comprehensive program has been formulated to assure fully-qualified service on the twin-engine Apache, Tri-Pacer and Super Cub in a network of centers which is eventually expected to total 200 locations.

First step in the plan has been the inauguration of a service school at the Piper plant at Lock Haven. Groups of service managers, maintenance and CAA personnel totalling 10 people at a time are put through an intensive week of instructions on systems and maintenance procedures coupled with practical shop work in dismantling, overhauling, servicing and reassembling of various components of the twin-engine Piper Apache, of which more than 600 are already in service.

Bell Helicopter Called to the Rescue of Florida's Flower-Clogged Waterways

Punta Gorda, Fla. The State of Florida has called for the helicopter to untangle them from a flower problem. Hundreds of miles of Florida drainage ditches and navigable waterways, from the Suwanee River south, including the St. Johns River watershed and Everglades region, are clogged perpetually by wild hyacinths. The flowers' uncontrollable growth is causing untold damage to shipping and agriculture, and is retarding mosquito control work by the stagnation of backed-up water.

Both private and state commissions have called upon the helicopter to spray a powerful herbicide on the troublesome blanket of flowers that covers the ditches. Because of the helicopter's ability to fly from one to two feet above the water's surface (in this case the tops of the hyacinths) and maneuver up one ditch and down another with ease, no other aerial or ground vehicle or method of operation can compete with the helicopter's speed and efficiency for this work.

A Bell Model 47G helicopter, equipped with spray tanks and spray booms which extend out vertically from either side of the helicopter's tail boom, and Dick Stansbery (Bell pilot), were dispatched to Punta Gorda (Peace River area of Florida) for a May 25 demonstration.

Newest Speed Modification for DC-3 Revealed in 'New Frontiers' Article

Los Angeles, Calif. The Douglas DC-3 transport plane, whose amazing longevity and versatility are without parallel in aviation history, seems to have taken a permanent lease on life, as revealed in the spring issue of *New Frontiers*, a publication of The Garrett Corporation.

The venerable workhorse has carved a niche as a private flying office for business executives, and now figures to strengthen its position in this field with the help of a "Maximizer Kit," which is distributed exclusively by The Garrett Corporation's AiResearch Aviation Service Division in Los Angeles.

The article comments, "With no increase in engine horsepower, the kit produces an increased speed of 20 miles per hour while adding a measurable margin of safety, payload, economy, and revenue." The "Maximizer Kit" includes an integrated and newly designed system of engine cowling, engine baffles, oil cooler ducting, wheel well doors, and exhaust system.

Expanded Use of Business Aircraft Urged at Mass. Aviation Conference

Westfield, Mass. "New England industry is behind other sections of the country in making use of industrial aircraft," said Horace Gooch, Jr., treasurer of Worcester Moulded Plastics Co., at one of three discussion panels in the field of *aviation in industry, aviation flight safety, and aviation in agriculture*, conducted during the third Massachusetts Aviation Conference at the 104th Air Defense Group headquarters at Barnes Airport.

Gooch, who shared the panel with S. Abbot Smith, president of Thomas Strahan Co., of Chelsea, on the "Aviation in Industry" discussion, told the 125 persons attending, "Industrial aircraft is to be the means of holding or losing markets for New England industries. This fact," he said, "is justified not on the basis of miles

flown by such aircraft, but in dollar volume of business and new customers gained. We can open new markets in the west because of the service we can give by use of aircraft."

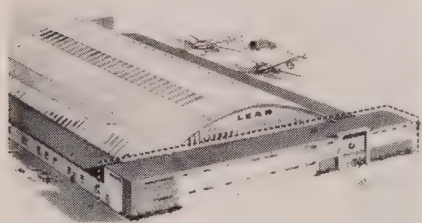
All six New England states and New York State were represented at the conference, by industrialists, agriculturists, civil defense, Air Force, Navy, airport managers, commercial airlines, chambers of commerce, Aeronautics Authority and the 104th Air Defense Group representatives. Serving as moderators were State Aeronautics Director Crocker Snow, State Commerce Commissioner Richard Preston, and Ralph Lovering, central New England CAA safety director.

Nationalcar Adds Car Rental Facilities

St. Louis, Mo. Nationalcar has recently increased the airport car rental facilities offered to its customers with the establishment of at-the-airport offices in a number of major cities previously served only by downtown stations. Among these is New York City, where Nationalcar now has offices at both LaGuardia and Idlewild Airports. A company spokesman said that plans are already well under way for further expansion of airport car rental facilities.

Lear Continues Plant Expansion; Licenses Italian Firm to Build Gyros

Santa Monica, Calif. The building program now under way at three manufacturing plants of Lear, Inc., involves a \$3.6 million expenditure, according to Richard M. Mock, President. Current plant expansion represents the largest for the company during any single year of its 25-year history.



At Santa Monica a two-story wing is being added to the hangar built in 1954 to house the Aircraft Engineering Division. The structure is of a highly functional design, featuring a brick and plate glass facade. It will bring to nearly 200,000 square feet the company's floor space in the Santa Monica area. Among activities to be carried on in the new space will be development and manufacturing by Lear's Instrument Products Division.

William P. Lear, Board Chairman of Lear, Inc., announced also that a leading Italian producer of precision devices has been licensed to manufacture the Lear gyroscopic system for indicating the attitude of an aircraft in flight.

The Italian firm is Officine Galileo di Milano s.p.a., headquartered at Milan. Included also in the agreement will be manufacturing rights to the Lear stability aug-
menter system.

... in the business hangar

- The Midland Division of Dow Chemical Company has two of their Pratt & Whitney R-1830-75 engines in Dallas Airmotive, Inc., for overhaul. G. T. Culpepper and M. P. Dow, pilots for Texas Illinois Pipe Line Company, visited Dallas Airmotive, Inc., where they are having one of their Pratt & Whitney R-2000 engines overhauled for their DC-3 "Texliner."

- Skymotive, Inc., Chicago, has just completed a double engine change and the installation of 100 amp. generators on one of International Harvester Company's Beechcraft D-18's, and is installing Bendix "X" Band Radar in Harris Aviation's Lockheed Lodestar.

- Among the Pittsburgh pilots who have had their ships at Qualitron for radio modifications were: Clyde Hauger with the Latrobe Construction Super Beech; "Chuck" Hanner, National Supply Martin 404; "Curly" Korb, Westinghouse Electric B-23; and Roy Weiland with the Mellon National Bank Lodestar. Mr. Gwinner represents Mellon Bank as NBAA member. Heppenstall Steel of Pittsburgh, Pa., has taken delivery of their new Lodestar, and Chief Pilot Jim Dougherty has reported extreme pleasure with the Qualitron custom radio COMM-NAV system. Basically the system consists of Collins equipment, an improved cabin entertainment system and a Qualitron custom-built, edge-lighted radio control panel. N-603H is based at Allegheny County Airport. When Charles Paul, Chief Pilot for Jones & Laughlin Steel, delivered to Pittsburgh, Pa., the newly acquired Lodestar N-1251W, it was immediately decided that N1251V, their first executive plane, should be identical. Within six weeks, Mr. Paul returned to Qualitron in Burbank to have 51V converted to 51W configuration. "Chuck" is NBAA representative for Jones & Laughlin, and is based at Allegheny County Airport.

- Aero Corporation of Atlanta recently completed X-ray examination of two additional executive aircraft. The H. K. Porter Company's Chief Pilot, Mr. Bob Gray, brought in their B-23 for examination of the wing and tail attach angles. Mr. John Corlett, Pilot for Continental Oil Company, scheduled their DC-3 for X-ray of attach angles, tail section and center section.

- Pilot Robert Elliott brought Associates Investment Company's D-18S to Southwest Airmotive's new Aircraft Hangar this month for a double engine change and major work. Aluminum and Brass Corporation's Aero Commander was brought in for a double engine change by Pilot Fritz Kingsbury. SAC's visiting pilots this month included Elliott Roosevelt, in his Piper Apache, and son Bill, in his Bonanza. R. L. Taylor brought his Cessna 190 in for minor repairs. Fast-growing Executive Flyers, headed by Pilot Bob Lyle, had its B-50 and D-18S in for repairs this month.

- The Patrick Welder Learstar is at Lear Aircraft Engineering Division in Santa Monica for 100-hr. inspection. Also at Lear A.E.D. is the Welder Twin Bonanza, getting a complete new exterior paint job to match the Learstar. Paul Crank is Welder's Chief Pilot. Chief Pilot John Rich and co-pilot Bill Marr brought the D. D. Feldman Learstar to Lear Aircraft Engineering Division for its eleventh 100-hr. inspection. Harold Bain is crew chief on the Feldman Learstar. One of United States Steel's Lodestars is at Lear Aircraft Engineering Division at Santa Monica for a Bendix X-Band radar installation to match those on the company's two Learstars. The second U.S.S. Lodestar is scheduled for a similar installation in July. Don Teel is U.S. Steel's chief pilot.

- Mr. William Burke, Pilot of Pure Oil Company, Chicago, brought their PV-1 in to Spartan Aviation Service for periodic inspection and relicensing. J. G. O'Neal brought the Kroger Company's Douglas DC-3 to Spartan for installation of Winslow Oil Filters and other modifications. Guy Polson, Pilot, flew Service Pipelines' Lockheed Lodestar to Spartan for installation of Spartan's Electric Trim Tab. Wayne R. Brodine brought Standard Oil Company of Indiana's Douglas A-26 to Spartan for engine change and overhaul of propellers. Myron Shnitka of Hycon Aerial Survey, Pasadena, brought their Lockheed P-38 to Spartan for installation of photographic equipment and other modifications. Frank Dent brought Skelly Oil Company's Lockheed Lodestar to Spartan for periodic inspection of engines and installation of Winslow Oil Filters on engines.

- C. E. Wheeler, Chief Pilot for Diamond Alkali Co., is very enthusiastic about the Bendix RDR-1-B-1 radar system recently installed in the company DC-3 by Chamberlain Aviation, Akron, Ohio. Installation included CAIR 1002-X radome. The Hoover Company's DC-3 is sporting a distinctive new paint job recently accomplished at Chamberlain. Bill Watt is Hoover's chief pilot and NBAA representative.

- Sinclair Refining Company's Chicago based Lodestar N-6060 is in Sinclair's Central Shop, Tulsa, Oklahoma, for a new interior. Pilots Dave Bishop and Pat Joyner are in Tulsa during this modification.

- Andy Stinis brought his G44 to Mattituck Airbase Corp. for relicensing and repainting. E. R. Harriman's Super Widgeon is in the shop for double engine change and 100-hour inspection. The pilot is Cliff Kernochan.

(Continued on page 50)

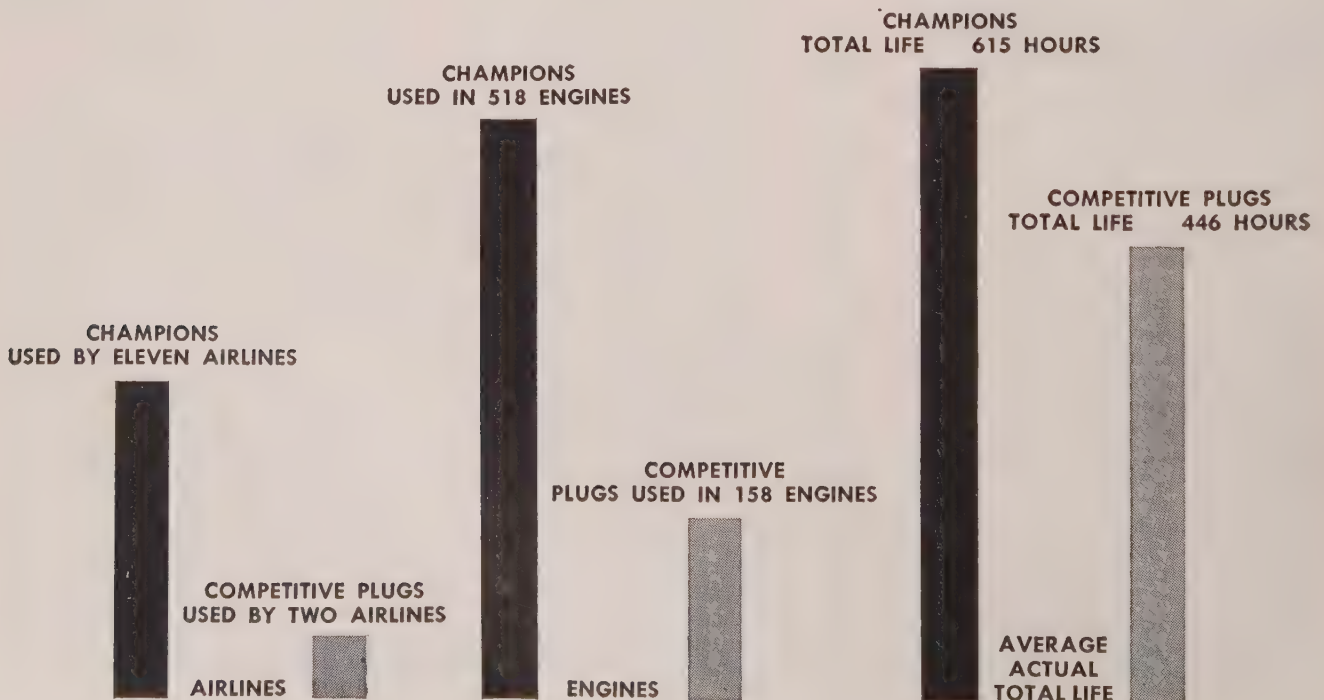
TO ALL EXECUTIVE AND

We know how much you respect the experience equipment. Here are the facts . . . supplied by the plugs, both for the demanding turbo-compound

TURBO-COMPOUND ENGINES

Airline	Type	No. Aircraft	Spark Plugs	Engines Using Only Champion	Engines Using Other Plugs
AMERICAN	DC-7	27	Champion	108	...
DELTA C&S	DC-7	10	Champion	40	...
EASTERN	DC-7	9	Other	...	36
	L1049C	16	Other	3*	61
NATIONAL	DC-7	4	Champion	14	2*
NORTHWEST	L1049G	4	Champion	16	...
PAN-AMERICAN (Atlantic Div.)	DC-7	9	Champion	26	10*
TRANS-WORLD	L1049G	20	Champion	80	...
UNITED	DC-7	25	Champion	100	...
KLM	L1049C	12	Other	2*	46
AIR FRANCE	L1049C-G	18	Champion	69	3*
TRANS-CANADA	L1049C	7	Champion	28	...
SEABOARD & WESTERN	L1049D	4	Champion	16	...
LUFTHANSA	L1049C	4	Champion	16	...

*Evaluation Test



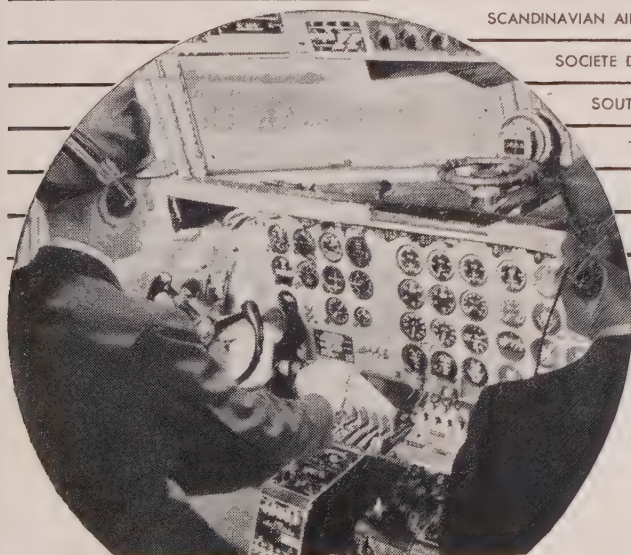
PRIVATE AIRCRAFT OWNERS:

of the major airlines in selecting the best flight airlines themselves[†] on their choice of spark engines and other reciprocating engines.

[†]As determined by survey, September 1, 1955

AIRLINES USING CHAMPION SPARK PLUGS

AER LINGUS	AERO O/Y	AEROLINEAS ARGENTINAS	AEROLINEE ITALIANE INTERNAZIONALI (ALITALIA)	AERONAVES DE MEXICO, S.A.
AEROVIAS GUEST, S.A.	AEROVIAS NACIONALES DE COLOMBIA	AEROVIAS VENEZOLANAS, S.A.	AIR ALGERIE	AIR CEYLON, LIMITED
AIR FRANCE	AIR INDIA INTERNATIONAL, CORP.	AIR MAROC	ALASKA AIRLINES	ALLEGHENY AIRLINES
AUSTRALIAN NATIONAL AIRWAYS	B.O.A.C.	BONANZA AIR LINES	BRAATHENS SOUTH-AMERICAN & FAR EAST AIR TRANSPORT	
BRANIFF INTERNATIONAL AIRWAYS	BRITISH GUIANA AIRWAYS, LTD.	CANADIAN PACIFIC AIRLINES, LTD.	CAPITAL AIRLINES	
CAT INCORPORATED	CATHAY PACIFIC AIRWAYS, LTD.	CENTRAL AFRICAN AIRWAYS CORP.	CENTRAL AIRLINES	
CIA. MEXICANA DE AVIACION, S.A.	COLONIAL AIRLINES	COMPANIA CUBANA DE AVIACION, S.A.	COMPANIA DE AVIACION "FAUCETT" S.A.	
CONTINENTAL AIR LINES	DELTA—C & S AIR LINES	DEUTSCHE LUFTHANSA	EASTERN AIR LINES	EAST-WEST AIRLINES, LTD.
ETHIOPIAN AIRLINES, INC.	FLUGFELAG ISLANDS, H.F. (ICELAND AIRWAYS, LTD.)	FLYING TIGERS	FRONTIER AIRLINES	
GARUDA INDONESIAN AIRWAYS N.V.	HAWAIIAN AIRLINES LIMITED	IBERIA	INDIAN AIRLINES CORP.	IRANIAN AIRWAYS
ISRAEL AIRLINES, LTD.	JAPAN AIR LINES	JUGOSLAVENSKI AEROTRANSPORT	KLM ROYAL DUTCH AIRLINES	
KOREAN NATIONAL AIRLINES	LAKE CENTRAL AIRLINES	LINEA AEROPOSTAL VENEZOLANA	LINEAS AEREAS DE NICARAGUA S.A.	
LINEE AEREE ITALIANE S.P.A.	MACKEY AIR TRANSPORT	MALAYAN AIRWAYS, LTD.	MARITIME CENTRAL AIRWAYS	
MIDDLE EAST AIRLINES	MOHAWK AIRLINES, INC.	NATIONAL AIRLINES	NATIONAL GREEK AIRLINES	NEW YORK AIRWAYS
NORTH CENTRAL AIRLINES	NORTHEAST AIRLINES	NORTHWEST AIRLINES	OZARK AIR LINES	PACIFIC NORTHERN AIRLINES
PAKISTAN INTERNATIONAL AIRWAYS	PANAIR DO BRASIL, S.A.	PAN AMERICAN-GRACE AIRWAYS, INC.	PAN AMERICAN WORLD AIRWAYS	
PHILIPPINE AIRLINES	PIEDMONT AIRLINES	PLUNA	QANTAS EMPIRE AIRWAYS, LTD.	REAL-AEROVIAS BRAZIL
REAL S/A-TRANSPORTES AEREOS	RESORT AIRLINES	SABENA	SAUDI-ARABIA AIRLINES	SEABOARD & WESTERN
SCANDINAVIAN AIRLINES SYSTEM				
SERVICOS AEREOS CRUZEIRO DO SUL, LTDA.				
SLICK AIRWAYS				
SOCIETE DES TRANSPORTS AERIENS DE L'EXTREME ORIENT (COSARA)				
SOUTH AFRICAN AIRWAYS				
SOUTHERN AIRWAYS				
SOUTHWEST AIRWAYS				
SWISSAIR				
TAN AIRLINES				
TRANS-AUSTRALIA AIRLINES				
TRANS-CANADA AIRLINES				
TRANS-PACIFIC AIRLINES				
TRANS-TEXAS AIRWAYS				
TRANS-WORLD AIRLINES				
TURKISH STATE AIRLINES				
TWA—TRANS WORLD AIRLINES				
UNITED AIR LINES				
VARIG				
VIACAO AEREA SAO PAULO, S/A				
WEST COAST AIRLINES				
WESTERN AIR LINES				

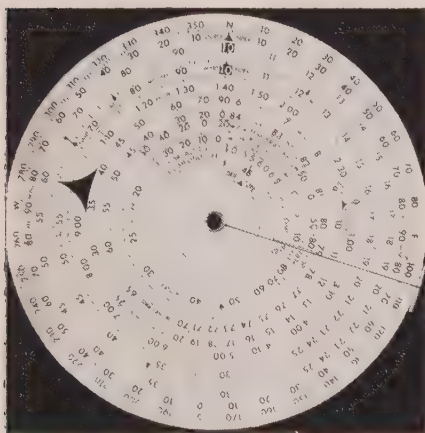


You Want The Same Safety And Performance The Airlines Demand . . . Make Sure You Get It! Specify

Champion Spark Plugs!

Handy Computer Solves NAV Problems on One Side

Aeronautical Services, Inc. of Annapolis, Md., has introduced their latest aviation aid, the ASI Computer. Designed to solve all navigation problems, including the wind triangle on one side of the handy, pocket-size circular slide rule, and offered at \$5.00, it should be equally attractive to pilots of all classes as well as professional navigators.



Airborne Radar Viewing Made Easier for Pilots

A cathode ray device that can make pictures "hold still" will permit pilots to view the desired weather-ahead picture without the frequent practice of taking his eyes from the controls to peer into a hood. By literally "stopping the action" almost like the movie trick, it gives the pilot time for careful study of what is to be seen on the scope.

He can see at a glance, night or day, and can control the time it takes the picture to fade, holding it brilliant up to two or three minutes, or erasing it at will. Present equipment has a high ratio of picture-fading to sweep rotation and requires a greater degree of interpretative skill.

The new device, a five-inch cathode-ray, halftone, direct-viewing storage tube, produces half tones and has sufficient brilliance to be "read" in sunlight, a capacity urgently desired in all radar usages, especially traffic control. An Air Force development project, it will soon be demonstrated for public viewing.

Volscan-Automatic Instrument Approach Transition

Crosley Government Products Division, Avco Manufacturing Corporation has announced the completed assembly of the first Volscan Air Traffic Control System, ready for delivery to the Air Force for flight evaluation. Volscan is a large analog computer and forms a link between traffic control radar and existing Ground Control Approach or Instrument Landing Systems. It has been termed the most effective existing solution to the mounting problem of air traffic control and is capable of bringing aircraft to the final approach entry point at the rate of 120 planes per hour. Volscan, Crosley engineers believe, can nearly triple the capacity of an airport. Volscan was conceived and an advanced development model was fabricated and flight tested by the Cambridge (Massachusetts) Research Center, U. S. Air Force. The Cambridge experimental Volscan system demonstrated its ability to convert a stream of randomly arriving aircraft into an orderly procession when it was flight tested four years ago. It was developed by a scientific team headed by Benjamin F. Greene, Jr., of the Research Center, winner of the Defense Department's Distinguished Service Award in 1955.

Unlike other systems still in the planning stage, Volscan does not require any special equipment aboard the aircraft. Any plane equipped with two-way radio may use it. A complete Volscan system includes 26 units. Three of the units are consoles for operators and are about the size and shape of a playing unit for a large theatrical organ. Here is an explanation, in non-technical language, of how the Volscan system operates.

When an aircraft comes within the radar scope of an airport (a 40 to 60 mile radius) its "blip" appears on a radar screen in front of an operator. Its location is spotted with a light gun and instantly the Volscan computers go to work. They have stored up within them the answers to every possible approach problem and in a fraction of a second, they assign a "cube in space" to the arriving aircraft. This "cube in space" is given to the pilot of the arriving aircraft by radio advising him to proceed at the

proper heading, altitude and air speed. The Volscan computer does this by projecting a course of flight which will delay or speed up the aircraft so that its arrival time at the "entry gate," both in approach and arrival, is efficiently and safely its own. The "entry gate" is a position in space some 1000 feet from the ground and two miles from the touchdown point at the end of the runway. The GCA or ILS System takes the aircraft through its final approach to the runway.

At present "hi-density" terminal airports, Radar Approach Controllers "pull" waiting aircraft out of holding stacks and mentally compute a transition path to the final approach, that will provide adequate minimum separation on final. The resultant landing flow is of the nature of one aircraft every three miles. At today's approach speeds, this means a landing every 1½ to 2 minutes (if no take-offs have to be made on same runway) or less than 40 landings an hour.

Even with Volscan, ground problems such as high speed turnoffs, insufficient taxiways and gate space and handling must be solved before "the acceptance rate" of airports can be improved.

It was pointed out that many commercial and military airports throughout this country and in Europe are equipped with radar. In many cases, this equipment can be coupled to the Volscan system. While declining to give any approximation of what a Volscan system, in production, would cost to install in a commercial airport, Mr. Nason said the figure would be substantially less than the construction of an additional airport runway.

Radar—An Alternative To Pressurization?

Practical flight experience with airborne radar has just about eliminated any need for pressurization in business aircraft, according to pilots who have used it.

Effective pressurization is either completely impossible in most present business aircraft, or prohibitively expensive, heavy, and difficult to maintain, and carries some risk of decompression. One purpose is faster cruising speed at higher altitude, but for the comparatively short distance of the average business trip, the little

actual net chock-to-chock time saving is largely or entirely offset by climb, let-down, and traffic losses, and doesn't justify the trouble and expense involved. The other advantage is the possibility of flight paths above unfavorable weather, but even the latest pressurized turboprop aircraft can't top all weather, which can easily extend to 40,000 feet.

Now, airborne radar has assumed the weather avoidance function of pressurization, and improved on it by making it simpler, lighter, cheaper, and safer. The radar equipped aircraft can pick the smoothest, shortest route around and between thunderstorms, turbulence, hail, etc. (and detect and identify them earlier and more accurately than any pilot), instead of having to climb over or go through them, and can make its entire flight at the lower, easier, safer, more efficient altitudes. (Thunderstorm avoidance is easier and less critical in the lower third of their altitude range.) This allows savings of operating costs from fewer trip cancellations and detours, as well as less crew and passenger fatigue. While pressurization is out of the question for most aircraft, several competing brands of radar are immediately available for DC3, Lodestar, and larger planes, and are being designed for twin Beechcraft and smaller.

Sperry announces the manufacture of a new lightweight APN-59 radar unit for first use in military transports and cargo aircraft. It is believed the use of these miniature systems will bring new, high levels of flying safety to fast, multi-engine aircraft.

Believed to be the smallest and lightest for its power and range, the Sperry equipment can perform varied, precise functions of search and surveillance, storm detection and other all-weather navigation procedures. Storms have been detected as far as 240 miles away.

Among many unique features of the 150-pound system is utilization for the first time in airborne radar of dual antennae.

The "picture" on a five-inch viewing screen can be adjusted for distortion-free viewing of target located at distances of 3 to 240 miles.

Magnification of small portions of the "picture" to enable operators to visually improve identification of coded beacons, ground and air objects also is possible.

The equipment can be oriented automatically to true north, the heading of the aircraft, or to any desired compass bearing for measurement of drift and other navigation purposes.

(Continued on page 52)

Air-Aids Spotlight

CHARLESTON, S. C.—VOR due shutdown until late in August.

CINCINNATI, O.—LFRange approach procedure turn now East side of NE course.

CRESTVIEW, Fla.—Change of West course LFRange to 083° indicates realignment of Red 30 direct MOBILE rather than via BAY MINETTE.

CROSS CITY, Fla.—Change of NW course LFRange to 124° indicates realignment of Blue 3 direct TALLAHASSEE.

FORT SMITH, Ark.—Control tower commissioned on 269 KC, 118.3 mc plus usual common calling and listening frequencies.

GREEN BAY, Wisc.—VOR shut down until August.

LA CROSSE, Wisc.—Landing minimums raised all categories VOR No. 1 approach account resurveyed terrain between VOR and airport.

LAS VEGAS, Nev.—CRYSTAL Fan Marker shut down, to be re-installed at and called LOGANDALE on NE edge of ADIZ boundary Amber 2.

MINOT, N. D.—VOR shut down until early August.

MULLAN PASS, Mont.—VOR frequency changed to 116.3 mc. NANTUCKET, Mass.—LFRadio Beacon shut down until approximately July 24.

NEW HAVEN, Conn.—LFRRange approach commissioned using BRIDGEPORT LFRRange.

NEW YORK, N. Y.—IDLEWILD second ILS providing front course facilities and straight-in minimums for Runway 22 due for commissioning. OAKLAND, Cal.—NEWARK Radio beacon and Fan Marker on SE course LFRRange changed to FREMONT identification "FRX".

UTICA, N. Y.—Minimums for new ILS are Straight-in Runway, 33,300 ft— $\frac{3}{4}$ miles; circling 400-1 2-engine or less, 500-1 $\frac{1}{2}$ 4-engine, alternate 600-2. ADF minimums start at 600-1 for straight-in.

TRENTON, N. J.—Some charts do not show correct TVOR frequency of 111.6 mc.

OGDEN, Utah—LFRRange approach No. 2 using NW course cancelled.

PITTSBURGH, Pa.—ALLEGHENY COUNTY—ILS Middle Compass Locator commissioned on 201 KC "GC".

—GREATER PITTSBURGH—Union radio beacon decommissioned, ADF approach No. 3 cancelled.

SACRAMENTO, Cal.—VOR shut down until early August.

SALT LAKE CITY, U.—ILS straight-in approach minimums now 200 ft— $\frac{1}{2}$ mile with new hi-intensity approach lights serving Runway 16L.

SAN DIEGO, Cal.—New TVOR approach serving Runway 9 straight-in offers 600 ft ceiling and 1 mile visibility minimums.

SPRINGFIELD, Ill.—ILS commissioned on 109.5 mc "SPI", serving Runway 4, approach bearing 038°, Glide Path 332.6 mc, LOM 230 KC "SP" 6 miles out, LMM 203 KC "PI" 400 ft out from approach end, altitudes and minimums to be published.

SULPHUR SPRINGS, Tex.—VOR shut down until late August.

REMINDER to Business Pilots flying own light aircraft on IFR or marginal IFR—Beginning August 1, an Artificial Horizon or equivalent direct reading Altitude instrument and Directional Gyro are required under revised CAR 43.30!

Importance of careful navigation whether IFR or VFR—An unidentified civil aircraft flew thru a Warning Area undetected by radar and was seconds away from being the target of a live, armed air-to-air missile when the alert AF crew detected the unplanned diversion and aborted the operation!

GENERAL NOTE—CAA proposing new regulations to protect instrument approach traffic at uncontrolled airports employing non-CAA IFR-approach facilities such as airline, state or municipally-owned TVOR's and radio beacons.

"MISSILE WITH A MAN IN IT"

Lockheed/USAF F-104

World's Fastest Jet

The F-104 *Starfighter*, now in production for the U. S. Air Force, is the most advanced airplane of its type ever developed. *Dimensions:* height, 13 feet, 6 inches; length, 54 feet, 9 inches. *Wings:* knife-sharp, and only 7½ feet from fuselage to wingtip. *Engine:* General Electric J79, which develops more thrust per pound of engine weight than any other turbojet of comparable size. *Electronics system:* new "plug-in" type, to permit quick changes and replacements of components. *Pilot's seat:* downward firing ejection type, the first in a production jet fighter. *High, T-shaped floating tail:* twice as effective in controllability as conventional tail designs. *Armament and top speed:* both are military secrets, but the Lockheed F-104 can overtake and destroy any plane—of any size—known today.

The *Starfighter's* dart-like configuration,

perfected by extensive wind-tunnel tests, permits the F-104 to flash through the sonic barrier, routinely, without a tremor. And even at supersonic speeds the *Starfighter* has unmatched ease and decisiveness of control—because never before have so many advanced design and engineering features been so superbly combined in one aircraft.

Like all Lockheed-built planes, the *Starfighter* has inherent "design flexibility" that makes it readily adaptable to a variety of military requirements—at lowest cost to our government.

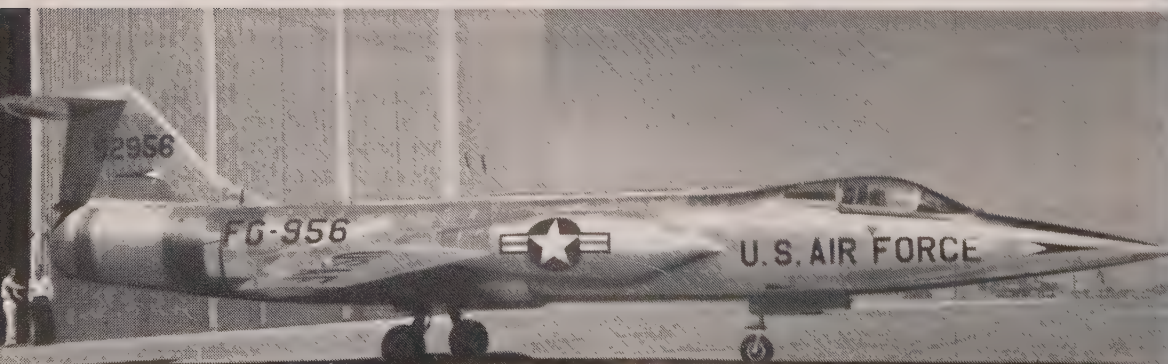
Lockheed's leadership in the design and production of military planes, of nine widely different types, stems from its policy of close cooperation with the armed services. In the F-104 *Starfighter* the U. S. Air Force has the world's fastest and deadliest jet—America's "Missile With a Man in It."

Lockheed

A I R C R A F T C O R P O R A T I O N

California Division, Burbank, Calif.
Georgia Division, Marietta, Ga.
Missile Systems Division, Van Nuys, Palo Alto
and Sunnyvale, Calif.
Lockheed Air Terminal, Burbank, Calif.
Lockheed Aircraft Service, Ontario, Calif.

LOOK TO LOCKHEED FOR J E T LEADERSHIP, TOO





LOCKHEED'S NEWS COLUMN

Dick Tracy has lost his lead in the electronics race. His wrist radio is surpassed by a new "miniaturized" TV camera. Small enough to fit into a vest pocket, its "eye" is about the size of a cigarette. Built by Lockheed for research ONLY.

Missile Mail is promised in the foreseeable future as a civilian development of missile technology. A Lockheed official says that the thousands of scientific and technical people now researching the whole environment of man in connection with missile development will produce civilian benefits beyond the imagination of the layman today. A letter by missile, of course, would get there faster than you could write the letter in the first place.

A Lockheed Man is working quietly in a sanctuary abroad on a nuclear engine design that will make headlines world-wide when they take the wraps off. Same man's blueprints on a nuclear contraption so startled top military authorities very early in the nation's atomic program that they locked his patent in a government vault where, for security reasons, it still remains...

Lockheed has been handed a big piece of the much-talked-about ICBM missile that will keep its Missile Systems Division scientists working nights in their new facility near Stanford University — which, incidentally, tripled in size between blueprints and ground breaking...

Beating the heat which tops 250 degrees Fahrenheit at twice the speed of sound is a matter of concern now to engineers of Lockheed's California Division who are working on methods of making airplane skin glass-smooth. Even modern, high-strength dural surfaces approach their temperature limits at these speeds...

Early America makes atomic history this month as Lockheed Georgia Division breaks ground for its new atom-powered plane facility. The 10,000-acre North Georgia site was in the same family ever since the area opened for settlement in the 1840's.



Air Taxi Business

By Albert D. Hughes

Air taxi operators are becoming expansion minded as the result of the growth of their business into other lines than their "taxi" function. Set up four years ago as an on-call service to the scheduled airlines, air taxi business has expanded in existing territories and the operators are performing new, bigger and better services in previously unexploited fields. Today, there are 107 air taxi operators operating in all except eight states and 26 scheduled airlines co-operate with the taxi group in making arrangements to pick up passengers.

Even the International Civil Aviation Organization recently recommended the preparation of a draft agreement which would establish freedom of operation for a number of non-scheduled operations, including air taxis. This means that the way is now prepared for air taxi services to be set up in other nations.

As an example of new fields, recently in Milwaukee, for instance, an executive wanted to transport 144 passengers to Louisville, Ky. The necessity for bringing the group in one movement made it difficult for a scheduled carrier to undertake the job. So the Milwaukee official put his problem to Air Taxi, Inc., a division of Gran-Aire, Inc., at Curtiss Wright Airport. Air Taxi was able to arrange a charter, through Purdue for two DC-3s, a charter from North Central Airlines for another DC-3, and a DC-7 charter from Delta Air Lines. When the four planes left Milwaukee, it was the largest air taxi movement on record, rolling up a total of 102,240 passenger-miles for the journey.

Contrasted with this large group was a charter performed late in 1955 by a New Jersey air taxi operator. He flew a small party to Miami, Fla., then on to Cuba, and Nassau, before returning to New Jersey.

Air taxi leaders make it quite clear that they will charter, or eventually, acquire larger aircraft provided they get enough business to make it worthwhile. In the meantime, they are performing an airline job, they say, with executive aircraft that have the range,

reliability and instrumentation equivalent to the larger planes.

Figures for the air taxi industry ending September, 1955, reflect the trend into newer lines of endeavor. Approximately 85% of the passengers carried during this period were on "other missions" than those concerned with making connections with the scheduled airlines. During this period well over 6000 passengers were picked up and more than 5000 made connections to the scheduled airlines (the remaining 15%). Air taxi business was up 30% over the like period ending September, 1954.

Many of the air taxi operators came into the business as an adjunct to their aircraft sales, maintenance and overhaul, charter work and student flying training. These circumstances, some of the operators believe, may form one of the best "sales bridges" from the general flying traveler to the specific ownership and operation of executive aircraft.

One such owner, an airline traveler, tried air taxi and found it useful especially for making airline connections from his distant suburb. He "sold" his company on the purchase of a corporate aircraft for his business. This official continues to use air taxi when he is unable to secure the use of his now-busy executive aircraft.

This user, in fact, pointed out that the convenience of ordering air taxi through airlines reservation sources, coupled with the airline-like demeanor and uniforms that some members of the National Air Taxi Conference now display, go great toward promoting more public confidence.

The scheduled airlines, in fact, will not deal with other than NATC members who display the kangaroo symbol of the group on their aircraft.

Typical of other users is an executive of a leading firm who recently stayed so long at a Long Island dinner party that it became impossible for him to catch a late plane departure from LaGuardia Field to the Middle West even by driving to the airport. Undisturbed, he called Red Bank Airport and ordered an air taxi.

Shortly, a four-place Beech Bo-

nanza arrived, picked him up and brought him planeside to LaGuardia in time for his flight.

The New Jersey operator, whose planes are a familiar sight at Idlewild and LaGuardia, averages 25 calls a day in summer and sometimes has handled as many as 40 trips a day. This company got started in typical fashion. Now one of the largest air taxi operators with a fleet of eight planes, the firm is also in hangar rental, lightplane dealerships and student training. The company added air taxi to its operations in 1951 and in the first year lost more than \$8,000. The firm made \$8,000 the next year, and, in 1953, profits climbed to \$13,000. Last year its net was around \$12,000. Meanwhile gross income had quadrupled, and the fleet has expanded from two to eight planes. The firm keeps five pilots on regular service and has four available for emergency calls.

Aerial ambulance service forms one of the growing segments of air taxi work. An Eastern operator received a telephone call from an airline office in Washington to pick up a woman, who was a stretcher case, in Roanoke, Va., take her to Billings, Mont. The pilot remained at Billings for three days, flying the woman back to Roanoke.

Other air taxi operations are interesting and varied. A Spokane, Wash., operator, for instance, flies sportsmen and vacationers to the many ranches and sports camps in the vicinity. This company has had the foresight to stamp tourist literature indicating spots or areas where its planes can go. A Hot Springs, Ark., student, sightseeing, survey and patrol outfit, operates four Cessnas in a shuttle service to Little Rock, averages 77 passengers a month, and often carries as many as 150 a month in season. The Hot Springs operator estimates that 80% of his gross income in 1954 came from his air taxi operations.

Some air taxis have established a zone system of fares similar to ground cab services. In the New York City area, for instance, nine zones have

(Continued on page 47)

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S-1



Official NBAA Report

NATIONAL BUSINESS AIRCRAFT ASSOCIATION, INC.

(formerly Corporation Aircraft Owners Association)

National Business Aircraft Association, Inc. is a non-profit organization designed to promote the aviation interests of the member firms, to protect those interests from discriminating legislation by Federal, State or Municipal agencies, to enable business aircraft owners to be represented as a united front in all matters where organized action is necessary to bring about improvements in aircraft equipment and service, and to further the cause of safety and economy of operation. NBAA National Headquarters are located at Pennsylvania Building, Suite 344, 13th & Pennsylvania Avenue, N.W., Washington 4, D.C. Phone: National 8-0804.

Arrangements Near Completion For Aviation Requirements Study

Edward P. Curtis, Presidential Aviation facilities aide recently revealed that arrangements are being completed for the far-reaching requirements study for the long-range aviation facilities program. "Responsibility for this study is being put in the hands of the most capable group we have found familiar with modern forecasting techniques and operations research methods," he declared.

The study will cover quantitative traffic and aircraft estimates both in terms of overall growth and specifically is between selected large and medium air traffic hubs. It will analyze aerodynamic characteristics of present and future aircraft, including those characteristics, such as takeoff and landing capabilities, taxi speeds, gross weight and maneuverability, which are most likely to affect future airport requirements.

CAA, the military, and others interested in the different segments of aviation will be called upon to furnish experienced people with the background of what is being done today.

The reason for studying future requirements, Curtis stated, is that "If we are to come up with a long-range plan towards which we can work for a number of years, it will have to be one that is practical and economically feasible and can command the support, among others, of the Congress. It is essential, therefore, that our forward estimates be based on the best available techniques, well documented and as readily defensible as any forward estimate can

be." He added, however, that the study will "make the fullest use of reliable information already available."

In the second phase of Curtis' presidential directive—which is to develop a comprehensive facilities plan—a requirements study will be "the real heart of our problem." Preliminary studies are now under way to determine the best method of developing such a system. "Our present concern," Curtis declared, "is that it will be necessary to postulate different systems or at least variations of systems which can be subjected first to operational analysis to obtain initial data on their capabilities and characteristics. Subsequently, those systems or portions of systems which look promising must be subjected to practical experimentation in as realistic an environment as possible."

Do We Too Often Sacrifice Safety To Save A Few Minutes?

Time is the very essence of life. It took time to learn to walk, to learn to fly, and to acquire the standards of living that we so enjoy today. Annually, we as a professional group arbitrate with our respective companies in matters pertaining to time. Monthly flight time limitations, trip time limitations and retirement age or time. Everything we do in our daily life is done in regard to time. As we grow older we slow down and purposely take more time to do all of our normal acts. We take time today to do things because it is better for us and because we have found that life is much more enjoyable if we don't hurry.

Safety in regard to time cannot be over-emphasized. Let's ask ourselves a question. Don't we too often sacrifice safety in order to save a few minutes? At home it takes several weeks to get started painting the house, we're in no hurry there, but put us in the cockpit at the end of a runway and see how fast we can get through the check list.

Did you ever push the nose down a few extra hundred feet when "off and on" just to keep from making a full instrument approach and saving maybe 5 or 6 minutes? If we go below those minimums to save time, we have lost safety. Maybe ATC clearances or regulations pressures sometimes force us to hurry when we should take a little more time.

In speaking of efficiency, a good job is usually never done in a hurry. Good products take time to produce and a good job

of smooth, safe, efficient flying also requires time, in many cases much more than we actually give. To cut corners in any phase of flying will most assuredly end in difficulties. "Haste makes waste" is a time proven proverb. If we give ourselves a break and not try to save a few minutes in haste, but take all the time required to do a safe and efficient job, many of us will live to enjoy that extra time later. (By an Anonymous Pilot)

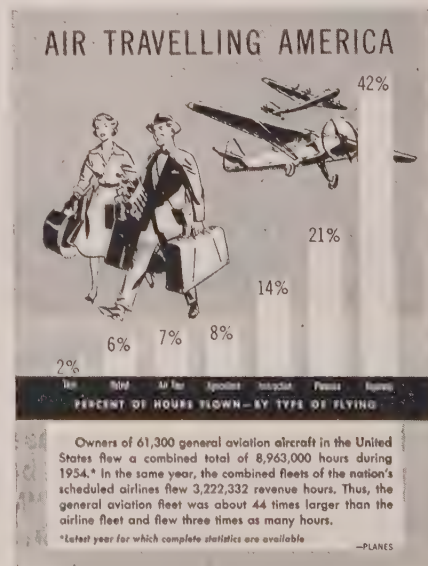
Are You Helping Your Community To Solve Its Airport Problem?

As an aftermath of NBAA's efforts to interest small industrial communities in developing single-runway airport facilities for business aircraft operators, National Headquarters has received most interesting letters from various members. One in particular included a copy of a speech recently delivered before the Bryan Chamber of Commerce on local airport development by Chief Pilot Clay M. Spear, of NBAA member the Aero Equipment Corporation of Bryan, Ohio.

Quoting in part from Spear's letter, which he stated: "As the result of the enclosed talk, an Aviation Committee was appointed to follow up the possibilities of Bryan having an airstrip. Though not a member of the Chamber of Commerce, I was asked to serve with the Committee."

Spear added an important observation which may well be heeded by business pilots who are faced with inadequate airport facilities in their community. "The average pilot, who could do the most to develop local interest in aviation, is usually non-talkative," he said. "I have found that local service clubs are very interested in hearing from pilots as to needs and new developments, and that it does not need to be a polished talk by an experienced speaker."

Copies of Spear's most interesting and instructive airport speech may be obtained by writing to NBAA National Headquarters. NBAA extends its congratulations to Spear for his aggressive action to bring an airport facility to Bryan, Ohio. *Are you aiding your community in the solution of its airport problem?*



CAA Proposes to Delete Holding Patterns from RF Charts

The necessity for publishing holding patterns on RF charts has been questioned by the CAA for some time. Some industry representatives have recently indicated that published holding patterns may serve no real purpose, recognizing that the controller includes nonstandard elements of any holding pattern in his clearance. Therefore, the CAA proposes to delete holding patterns from all RF charts, including terminal area charts, for the following reasons:

1. Operational requirements for publishing holding patterns on RF charts appear outweighed by other considerations.

2. Deletion of holding patterns will permit clarification of other and more important information on the charts.

3. Pilots have been questioning clearances which did not detail nonstandard elements of a holding pattern as shown on their charts. In many instances, the holding pattern had been changed or the controller desired the aircraft to hold in a standard pattern. Consequently, unnecessary radio contacts were required to explain the proper holding path to the pilot.

If you have any comments on this proposal, send them directly to Henry S. Chandler, Acting Chief, CAA Airways Operation Division, W-380, Washington 25, D. C.

Theodore Hardeen New Chairman Of Interdepartmental Aviation Manpower Committee

Theodore Hardeen, Jr., is the new Chairman of the Interdepartmental Aviation Manpower Committee, which was established by the Secretary of Commerce to study manpower requirements of the aviation industry.

The committee will complete studies which will be the basis for peacetime and mobilization plans to meet the manpower requirements of the industry. NBAA is serving in an advisory capacity to the Committee in connection with business flying problems.

CAA Concludes Study On VFR Requirements

The CAA recently concluded a comprehensive study of VFR navigation requirements which is being reviewed by the Air Coordinating Committee NAV Panel.

In light of its interest and importance to business aircraft operators, the study has been condensed for inclusion in our NBAA REPORT.

Early CAA attempts to provide electronic nav aids were justified to the Congress on the basis that the regular carriage of mail and passengers in air commerce was of such importance that it should be interrupted as little as possible by bad weather. Low and medium frequency four-course radio ranges served as the standard en route nav aid for many years and were successful to the extent that bad weather flying became commonplace on the 74,000 miles of colored civil airways. The conduct of IFR flight is, of course, wholly dependent on a system of electronic nav aids.

In good weather it was usually possible to navigate many of the routes entirely by visual reference to the ground during day-

light, and visual en route aids were provided to assist VFR flights at night. With the passage of time and the great increase in air traffic, it was found that the low frequency ranges and associated voice communications also were a great help to the non-instrument pilot using the airways under VFR and marginal VFR conditions. The coverage of the low frequency system was "down to the ground," and low flying single engine aircraft could communicate with CAA stations and obtain weather information pertinent to the flight.

The L/MF and VHF radio ranges and associated voice communications provide guidance and information to the VFR flyer which is similar to the guidance provided to the motorist by the system of highway signs showing route numbers, mileages, and directions. The available electronic nav aids and communications are as useful, correspondingly, to the VFR flyer in unfamiliar country as the highway signs are to the motorist who is following a route unfamiliar to him. The nav aids are particularly valuable and reassuring in country which is devoid of easily identifiable physical features.

It follows that with positive knowledge of position and weather conditions, the usefulness of the VFR airplane is increased in that a pilot can proceed over new or unfamiliar routes with assurance. Efficiency is increased by the ability to fly direct routes with less reference to landmarks, and less time is lost in searching for landmarks. Safety to persons and property is, of course, enhanced. With the advent of faster single-engine aircraft, the usefulness of the aircraft for VFR flight is further enhanced by electronic nav aids because time for study of distinguishing ground features is reduced, and the maneuverability of the aircraft is not as great as formerly. The usefulness of electronic nav aids for night VFR flight is, of course, even greater. All of these advantages were available to VFR pilots who equipped their aircraft with the required L/MF receiver.

The following statistics show the potential use of nav aids for VFR flight:

Analysis of 4285 replies received showed that 21% of those replying used CAA electronic nav aids for navigation (not just for communications) from 50% to 75% of the time during VFR cross-country flying, and 41% used the nav aids from 75% to 100% of the time.

Pattern of VFR Flying in 1955

A CAA study of peak day general aviation and military VFR flight plans in 1955 established certain facts concerning the relationship of IFR and VFR flying, some of which are outlined below.

1. On a typical VFR peak day in 1955 there were 28,226 aircraft departures (flights) of which 53% were general aviation, 17% military, 30% air carrier.

2. On a peak IFR day, there were 11,290 departures; only 40% of the peak VFR activity.

3. VFR departures were 64% concentrated in the 149 air traffic hubs, (places originating 0.05% or more of the annual number of enplaned airline passengers), and 54% of the general aviation VFR departures was from hubs.

4. General aviation peak day VFR departures were primarily concentrated in 106 locations, of which only 17 had less than a significant number (10) of IFR peak day aircraft departures.

5. Similarly, 124 locations had 10 or more military VFR departures on the peak day, of which only 17 locations had less than 10 IFR departures on a peak day.

6. General aviation VFR flights are dispersed; about 2/3 of the VFR flight plans begin or end at a non-hub.

7. General aviation VFR en route flying, however, where it is in significant amounts, conforms closely to the normal flow of all IFR air traffic. The study shows that measures of high density IFR traffic can well serve to indicate significant concentrations of en route general aviation air traffic. The same can be said for military VFR traffic.

The development of the VHF omnirange system followed the same general course as the L/MF system, i.e., high density routes were implemented first, but limited funds dictated spacing based on first pro-

Radio in Non Carrier Aircraft

Item	1948	1953
Aircraft with a radio range receiver	43	61
Aircraft with L/MF range receiver	43	40
Aircraft with a VOR range receiver	.1	21
Aircraft with two-way radio	36	48

Note: 90% of non-carrier civil aircraft produced in 1955 for use in this country had two-way radio as standard equipment.

Amount of IFR vs VFR Flying

Item	IFR	VFR
FY 1955 Contacts by INSACS-Other Civil	727,519	1,677,421
FY 1955 Contacts by INSACS-Military	2,805,669	995,505
FY 1955 Flight Plans Originated at INSACS	361,750	503,774

Aviation in 1954

Category	Approximate Hours Flown	Approximate No. of Aircraft
Scheduled Airlines	3,600,000	1,500
Business Flying	3,875,000	22,000
Other General Aviation	5,100,000	33,000

viding coverage at minimum terrain clearance altitudes for instrument flight along the route, over as many routes as possible. This first stage of implementation is well along, and many Victor airways are available for IFR flight. It is now considered reasonable to approach the task of providing coverage at lower altitudes so that the VFR flyer may not be without communications and navigational guidance when flying the Victor airways at altitudes within the capability of his aircraft. This is especially true in mountainous areas where there is much navigable airspace at altitudes below those required for safety under non-VFR conditions.

The altitude of 700 feet above terrain was selected as the new coverage objective because it is desirable that VFR flights be able to use the airways and the electronic nav aids below the levels reserved for IFR flight.

The designated control areas are largely coincident with the airways system (either the colored airways or the Victor airways). The airways extend upward from the surface of the earth, but the control areas extend upward from 700 feet above the surface of the earth. By regulation, aircraft flying VFR are prohibited from operating in control areas whenever the flight visibility is less than three miles but not less than one mile.

When conditions are such that VFR flights are being made at or below an altitude of 700 feet on the colored airways, navigation guidance is available from the L/MF nav aids defining such airways. This coverage is not, however, continuously available to VFR flights made at or below 700 feet above the ground on the Victor airway system as it is presently constituted. The facilities defining the Victor airway system are located approximately 90 statute miles apart, and provide navigation coverage down to an altitude of 1000 feet above the ground at a point midway between them. Coverage at an altitude of 700 feet is available for only 84% of the distance, at an altitude of 600 feet 77% of the distance, and at an altitude of 500 feet 71% of the distance, generally speaking.

The provision of navigation coverage at an altitude of 700 feet above the ground, on the Victor airway system, conservatively will require the location of facilities approximately 60 nautical miles (70 statute miles) apart. Facilities so located will provide coverage down to 600 feet for about 93% of the distance, and down to 500 feet for about 85% of the distance. The CAA has announced plans to install the facilities needed to obtain 700-foot coverage on the Victor airways.

New Southwest Airmotive Shop Opens at Love Field, Dallas

A new 50,000 sq. ft. aircraft shop has been completed by NBAA member Southwest Airmotive Company as the first unit in a \$2,000,000 building program announced by the firm for a 35-acre site it has leased on the east side of Love Field, Dallas. Aircraft division work will continue uninterrupted as, late this year, this hangar is extended on either side to form a lobby, flight operations, restaurant and aircraft storage facility nearly 1,000 ft. in width.

Nearby, SAC will erect two other large hangars, a local headquarters for Slick Airways, and a two-story, air-conditioned building for general office and distributor-sales purposes. Like the initially-completed aircraft shop segment, all units will be finished in buff brick, with matching trim. Plans call for the entire area to be surrounded by concrete ramps and to be professionally landscaped.

The aircraft shop includes air-conditioned electrical department, instrument laboratory, offices, and customers' conference room. An enlarged Hamilton Standard-approved propeller department is located in one of the hangar's wings. Although ramps and taxiways haven't yet been paved, the shop is in use, with aircraft being rolled across a temporary crushed rock hard stand.

SAC's move—most comprehensive to be announced to date in the business flying field—was prompted by City of Dallas airline terminal construction at the heart of the company's present facility on Love Field's south side. The 100,000 sq. ft. Southwest Airmotive engine plant is located permanently on another part of the airport and will not be effected. It is currently engaged in the highest volume of business aircraft engine overhauls in its history.

High Speed and Density Call For New Exterior Aircraft Lighting

The CAB has announced proposed rule making in connection with position and anti-collision light requirements and the facilitation of experiments with exterior lighting system.

The continuing increase in air traffic density and the advent of airplanes capable of appreciably higher speeds than heretofore attained demand, according to the CAB, further improvements in the exterior lighting of aircraft. The presently effective regulations in Parts 3, 4b, and 6 of the Civil Air Regulations require the installation of position lights and prescribe certain specifications for such lights. There are also contained in these same parts of the regulations certain specifications for anti-collision lights, and there is a regulatory requirement in Parts 40, 41, 42 and 43 that they be installed on all airplanes of more than 12,500 pounds by May 31, 1956. In addition, Special Civil Air Regulation No. SR-392A permits under certain conditions experimentation with exterior lights which do not conform to the specifications in the regulations.

Recent experience with exterior lighting systems, the CAB indicates, necessitates a thorough re-evaluation of the pertinent regulations. The main issues are concerned with: (1) the specifications for anti-collision lights, (2) the specifications for position lights, and (3) the facilitation of experiments with exterior lighting systems. These three issues are being made the subject of specific proposals which follow.

In summary, the CAB proposes to establish new specifications for anti-collision lights and to revise the specifications for position lights by eliminating the use of flashers and, in dual circuit systems, the fuselage and red tail lights. These new specifications for anti-collision and position lights are proposed to be applicable to all

future new type aircraft regardless of category. Although the new specifications could be used on present aircraft, such use would be on a voluntary basis, and it is proposed that presently approved systems be allowed to be used indefinitely. In addition, it is being proposed to permit further experimentation with exterior lighting on both air carrier and non-air-carrier aircraft, rather than on only air carriers.

Business aircraft operators concerned with this proposed rule making may obtain a detailed copy, including specifications for anti-collision lights, by writing to the Bureau of Safety Regulation, Civil Aeronautics Board, Washington 25, D. C.

CAB Seeks Stay On Wing Markings Deadline

CAB's Bureau of Safety Regulation is seeking an extension of the deadline for comments on a proposal authorizing operators to replace present wing markings with identification on fuselage sides and vertical tail surfaces. This proposal was released last year and carried a 1960 effective date. Subsequent comments from aircraft operators, however, led to the adoption of a temporary provision which will expire on July 27 of this year.

Under the proposed amendment for extension of the deadline, operators may now remove upper and lower wing markings, provided vertical tail or fuselage identification is properly affixed. If adopted, the amendments would require horizontal letters and numbers at least 12" high on both sides of fuselage or on both sides of the vertical tail. CAB said the proposal, which would supersede Special CAR SR-412, provides a four-year effective period.

An extension of the Special provision is favored by the CAB, to collect more information to reach a final ruling. Comments are welcomed by the Board.

500 Surplus USAF Planes To Be Sold This Summer

The U.S. Air Force is planning to sell approximately 500 surplus aircraft during the late spring and summer. Included are single-engine trainers, twin-engine trainers and cargo aircraft, and some four-engine transports. The original cost of the aircraft exceeded \$52 million.

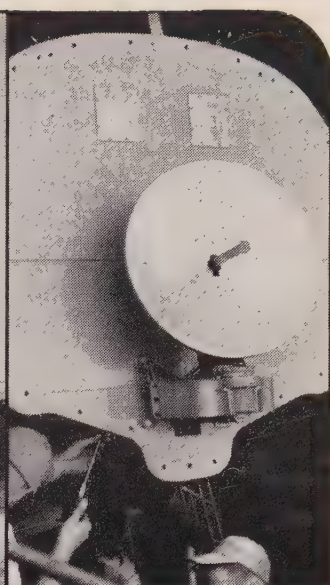
According to the Air Materiel Command the USAF will, within the next few months, sell 22 surplus transport aircraft, at Davis-Monthan AFB, Tucson, Arizona, including four Boeing YC-97s, purchased in 1954, eleven Douglas C-74s, purchased in 1942 and seven Chase YC-122 assault transports, purchased in 1949. Originally the acquisition price of these aircraft was \$25,847,522.

Within the next several months, four sales of about 50 cargo and trainer aircraft each at Hill AFB Ogden, Utah, are scheduled. The Hill sales involve Beech C-45s, T-11s and T-7s, bought for almost \$20 million between 1941 and 1944.

Inquiries regarding these sales may be directed to the Property Disposal Officer at Hill AFB, Ogden, Utah, Davis-Monthan AFB, Tucson, Arizona, and Kelly AFB, San Antonio, Texas.

(Continued on page 46)

INSTALLATION RECORD



ANT-1 Radar Antenna
Nose mounted antenna designed for transport and executive type aircraft. 22" X-band scanner concentrates energy into a pencil beam.

COMPANY:	ADDRESS:	AIRCRAFT:	WEATHER RADAR:
Cornell - Dubilier Electrical Corporation	South Plainfield, N. J.	DC-3	BENDIX RDR-1

BENDIX weather radar

on more executive aircraft than
any other make!

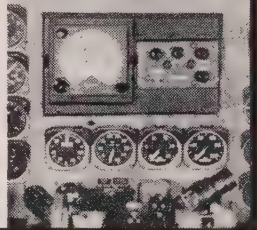
Here's what Chuck Woodward, pilot of Cornell-Dubilier's DC-3, has to say about Bendix Weather Radar:

"Our plane was the first executive aircraft in the world to be equipped with weather radar. We selected the Bendix RDR-1 system. At first, we were concerned as to the practicability of radar for executive planes. But our complete success with it has made us enthusiastic. For example, on a recent flight from Richmond to Raleigh, we found thunderheads strung right down the center of the airway. Following the indication on our radar scope, we moved over five miles and missed the whole works. That's just one entry in our weather log book where radar has been the key to solving a flight problem. We've seen Bendix Weather Radar do many wonderful things. Time and time again, we've picked our way between storm cells and avoided detours. For us, Bendix Weather Radar represents a new era for safer weather flying."

Bendix* Weather Radar, available in either C-band or X-band, will add both safety and speed to your operation. It penetrates storms up to 150-miles range and gives you a complete picture of what's in store from a weather standpoint. In addition, it can also be used as a navigational aid and for terrain mapping. Write for complete information. Or contact your nearest Bendix Radio dealer.

* Reg. U.S. Pat. Off.

Cornell - Dubilier's DC-3 instrument panel shows centralized location of radar scope. A shielded sight fits over the scope for daytime use. 0-20, 0-50 and 0-150 mile range displays are provided.



Among companies who have specified Bendix Weather Radar are:

J. S. ABERCROMBIE, Houston, Texas
ALUMINUM COMPANY OF AMERICA, Pittsburgh, Pa.
COLUMBIA GAS SYSTEM, INC., New York, N. Y.
CONTINENTAL CAN COMPANY, INC., Morristown, N. J.
DAVISON CHEMICAL COMPANY, Baltimore, Maryland
DIAMOND ALKALI COMPANY, Cleveland, Ohio
FOOD MACHINERY & CHEMICAL CORP., New York, N. Y.
THE GENERAL TIRE & RUBBER CO., Akron, Ohio
ARTHUR GODFREY, New York, N. Y.
IDEAL CEMENT COMPANY, Denver, Colorado
ISLAND CREEK COAL SALES COMPANY, Huntington, W. Va.
KEWANEE OIL COMPANY, Philadelphia, Pa.
KUDNER AGENCY, INC., New York, N. Y.
LANDIS TOOL COMPANY, Waynesboro, Pa.
LEAR, INC., Santa Monica, Calif.
MINE SAFETY APPLIANCES CO., Pittsburgh, Pa.
MURRAY CORPORATION OF AMERICA, Detroit, Michigan
NATIONAL DISTILLERS PRODUCTS CORP., New York, N. Y.
SEARS, ROEBUCK & CO., Chicago, Illinois
SOUTHERN PRODUCTION CO., INC., Fort Worth, Texas
STAMFORD ROLLING MILLS CO., Springdale, Conn.
TENNESSEE GAS TRANSMISSION CO., Houston, Texas
THATCHER GLASS MANUFACTURING CO., INC., Elmira, N. Y.
TRIANGLE CONDUIT & CABLE CO., INC., New Brunswick, N. J.

Bendix Radio

DIVISION OF BENDIX AVIATION CORP., BALTIMORE 4, MD.

West Coast Sales: 10500 Magnolia Blvd., N. Hollywood, Calif.

Export Sales & Service:

Bendix International Division, 205 E. 42nd St., New York 17, N.Y., U. S. A.
Canadian Distributor: Aviation Electric, Ltd., 200 Laurentian Blvd., Montreal, Que.

Skyways Round Table

(Continued from page 20)

illness. Let's say you had difficulty with your hearing and were off from work three months. If you had a 30-day waiting period, this would entitle you to 60-day temporary benefits. Then if you went back on flying status and 30 days later you had a recurrence of the same ear trouble, which continues for an additional 22 months, your benefits would be exhausted at the end of 22 months rather than the standard 24 months, since you already have used two months for the same claim.

Henry W. Boggess: *That is a good illustration, Bill.*

William R. Vance: Now, if in six months you had, for example, trouble with your eyes, then you would be given the full 24 month period for that particular claim. If other unrelated disability subsequently occurs, the full amount is given again. Only in the event of a recurrence of an established injury would it begin to reduce the total amount.

Clarence N. Sayen: Along the same line, then, on initial application, suppose the individual has a waiver on his medical certificate which indicates a tendency toward some disqualifying condition. If he indicates that on his application, is he eligible for the insurance in view of that particular disability?

William R. Vance: Mr. Sayen, I believe that brings up the old standard accident and health provision. If there is a known condition at the time of application, that condition is not insured against unless specifically accepted by the underwriter. What would happen in an individual case with our insurance program is that if the person listed, for example, had sustained some ear trouble in the past, he should give us a medical report on how completely he had recovered from this injury or illness. Then, we, as underwriters, would examine the possibility of a recurrence and either accept the applicant to be fully insured or possibly exclude him all together. Perhaps we would charge a higher premium and include it. It would be one of those three in every instance.

Clarence N. Sayen: Again, if he made the application and didn't disclose the waiver and made a claim on that point, the claim would probably not be allowed. Is that correct?

William R. Vance: It goes back to basic insurance procedures, I believe. In handling claims, it always has been the burden of the company to prove that the claimant had knowledge of his condition prior to applying for coverage.

Clarence N. Sayen: I thought this should be understood, because it is one of the difficulties that arise after you get your program going. Invariably you run into somebody who didn't make a complete disclosure in the first place and then he wonders why he isn't getting paid under the policy. It's a perfectly normal requirement that they disclose any physical disability.

Henry W. Boggess: *I think that is a very good point, Mr. Sayen, and appreciate your bringing it up. We have another gentleman here from Detroit who is representative of industrial pilots. He has been sitting quietly so far. I wonder, Mr. Henning, if you have*

any comments with reference to this insurance coverage that you would like to offer?

Hal Henning: (Operations Manager, Air Transport Section, General Motors Corp.): No, Henry. I am present only as an observer and in that capacity I feel that I should not participate in the discussion.

William R. Vance: I believe our insurance coverage is based on common sense. If a pilot, for example, has an appendectomy, from which we know he could get a complete recovery in say 60 days, and this person has the attitude that he still wants 6 months income from this appendectomy, it is logical that the underwriters would request that he be examined by a CAA examiner of their choice to determine whether there were sufficient complications from the operation to entitle him to additional benefits.

Henry W. Boggess: *In any event, I think the root of the question may hinge on this. The medical examination would in all instances be done by qualified CAA examiners who know the professional qualifications of pilots.*

William R. Vance: That is correct.

Henry W. Boggess: *I would like to point out that NBAA's members are the owners and operators of business aircraft. Therefore, the coverage is exclusively for the pilot employees of these member companies. The only way an individual pilot could qualify would be by affiliation with either a regular or associate member of NBAA in a flying capacity with them.*

Clarence N. Sayen: May I ask a question at this point? Let's say an airline has some 600 pilots, and 15 of them do corporate flying on a contract basis. If the airline is an associate member of NBAA, does that make the 15 pilots eligible or the 600 pilots eligible?

Henry W. Boggess: *All professional pilot personnel employed by a member, associate or regular, are eligible for this coverage.*

Clarence N. Sayen: United Airlines, I believe have about 4 or 5 pilots doing corporate flying out of a total of 1,400 pilots employed. I don't know whether United is a member of the NBAA . . .

Henry W. Boggess: *They are an Associate member of NBAA.*

Clarence N. Sayen: Then all 1,400 United pilots would be eligible for this coverage.

Henry W. Boggess: *That is correct.*

William R. Vance: As you gentlemen may know, there are proposed amendments to parts 49 and 43 of the Civil Air regulations regarding CAA requirements for first and second class medical examinations. In our policy, we state specifically that a claim is based upon inability to meet the minimum requirements of a CAA first or second class airman's medical certificate. Those are minimum requirements. Lowering the minimum to some extent proves to the benefit of the underwriters and not against them claim-wise.

Henry W. Boggess: *A very good point, Bill. The aim of all group insurance is to hit an average. You cannot individually adjust one policy covering a great number of variables among member companies. But you can get the average for them. That is the reason that each pilot has selection of a waiting period. His respective employer*

might have a disability sickness program which would indemnify him for any loss for 60 days. In such event, he could buy at a lesser cost the coverage beginning on the 61st day. The group policy cannot do what the individual policy could do. If it did that, its premium would probably have to be about the same as the premium of an individually bought policy, which is much higher than the group policy. It's the buying power here which the NBAA is exercising on behalf of its members and their pilot employees which permits this lower rate and which requires, of course, some standardization in coverage. We are trying to get the best coverage possible at the lowest group rate for that employee, and to give indemnity to professional pilots whose livelihood depends upon that status. These are the only type of employees of our member companies whom we intend to insure. Most of our members, certainly the majority of them—up in the high 90%—are companies who use aircraft as a tool in their business, and of necessity employ professional men to operate them. There may be a very small percentage of men who might "double in brass," or do two jobs. Piloting aircraft may be one part of their overall job. This policy is not, frankly, written for that type of coverage. We may develop, with a little experience, a new way of handling it.

William R. Vance: We should keep one thing basically in mind all the way through our discussion, and that is that this insurance is designed for one purpose only. It is to provide a method of reimbursing a person for loss of income actually suffered. There's a twofold reason. One is that this insurance has become a necessity in the business-aircraft field just as Mr. Sayen found it necessary in the airline field. Secondly, we must continue to attract high-calibre persons into the aviation field for piloting careers. That alone has presented a serious problem. In recent years, the supply of young men coming up in the industry isn't as large as it could be. We feel that the additional security which guarantees loss of income protection against possible loss of medical certificate, or inability to earn your income in your chosen profession, will attract, or continue to attract, a young intelligent group of people into business flying because they do feel that they have a greater degree of job security. It also will keep active some of our better flight personnel who are now approaching their mid-forties, and beginning to worry about their next physicals. I think, basically, that was the purpose of designing this entire insurance program. Naturally, it's what we hope to accomplish with it.

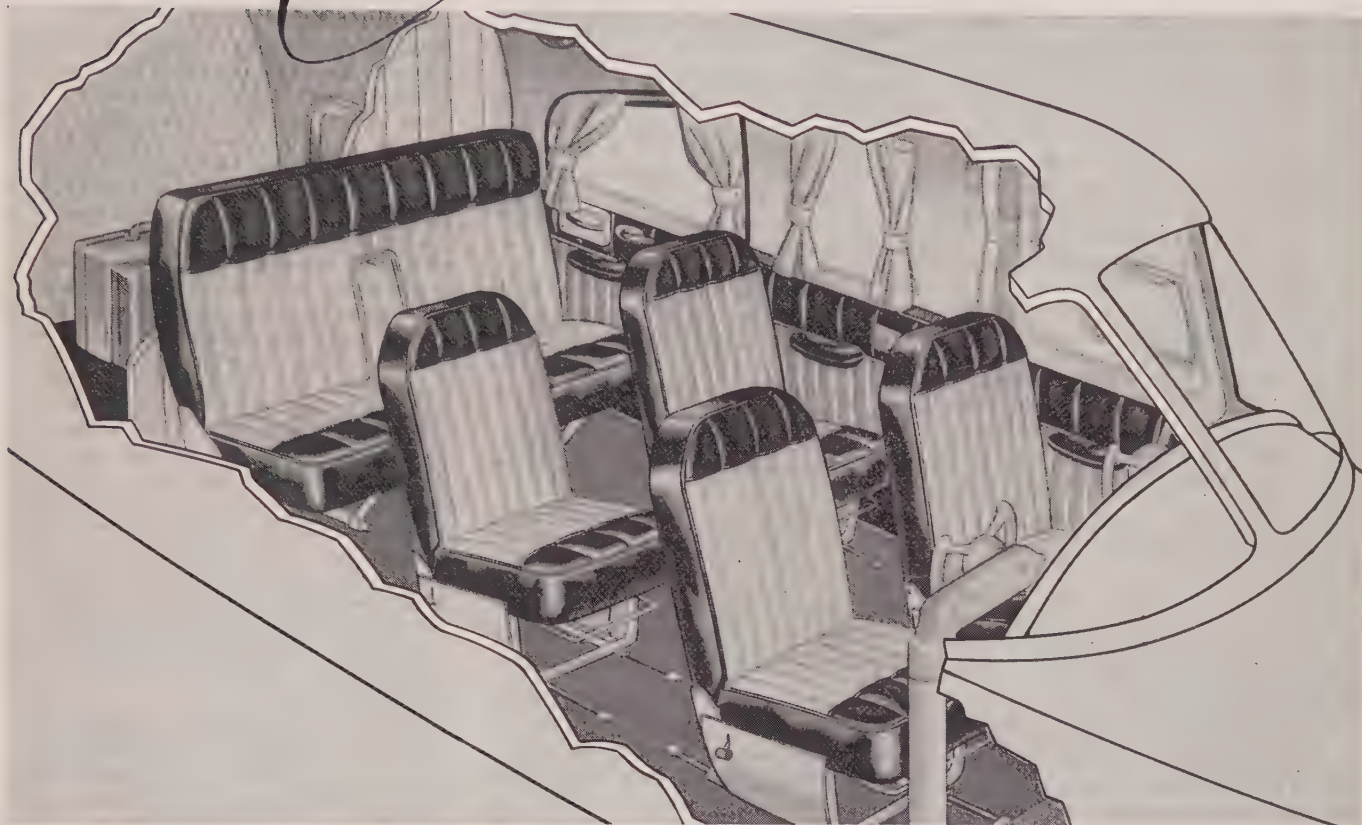
Henry W. Boggess: *Actually, it's security for an adjustment period in the event of loss of medical certificate. Now, while we're on that point, Mr. Vance, will you please tell us something about the variable benefits that are available and what the limits are, such as the weekly indemnity, I believe specified at \$100, \$150, \$200. What are the limitations imposed upon the applicant who seeks to buy coverage for one or the other of those amounts?*

William R. Vance: Following general underwriting rules, a person cannot purchase more income than he actually earns.

(Continued on page 38)

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Skyways Round Table

(Continued from page 36)

In other words, you can't insure against a greater loss than you would possibly incur. I think perhaps it would be advisable to illustrate exactly how a person would go about selecting the proper amount of weekly indemnity benefits and the proper waiting period. The pilot who works for a corporation paying him \$7,500 a year would qualify under the \$150 a week income bracket. The pilot should know or find out from his company personnel manager whether there is an established program for wage continuation because of inability to perform duties. After getting information as to whether his salary is to be continued for 30, 60, 90 or 180 days, he would then select the proper waiting period and make application for coverage on the \$150 weekly indemnity basis.

Henry W. Boggess: *If he selects the \$150 per week, and at some subsequent date after he's fully insured, he does have a disability which is defined under the policy and which causes the loss of his medical certificate, how long will that \$150 per week be paid as a maximum?*

William R. Vance: Twenty-four months, or 104 weeks.

Henry W. Boggess: *After that period he has exhausted the full face value of his coverage?*

William R. Vance: That is right. During the two-year period, the idea is, of course, that he would have an opportunity to train for a new occupation, either in the same company or with another one.

Henry W. Boggess: *Mr. Vance, I'm sure that when an employee, in good faith, makes an application, that his employer might at the time have a benefit plan that had only a 30-day provision to take care of him, and during the policy year might amend that and extend those benefits to even 180 days. You're bound under the policy, as I read it, to pay him on the 30-day waiting period basis even though there's been a change and he's going to get full salary for another 150 days.*

William R. Vance: It's conceivable, Mr. Boggess, that you would have an employee who, during the policy term, would come into the one-year benefit. This would be a greater range than he had at the time of application. Obviously, there was no intent to make a misstatement or anything else. He had merely come into a different range during the course of the policy term.

Henry W. Boggess: *And he is, therefore, entitled to the benefits on the basis of the waiting period for which he has paid premiums?*

William R. Vance: Well, in the event of an economical recession, shall we say, where there might be a reduction in salaries, the same thing would still apply. A person who honestly made \$150 a week at time of application and was later reduced to \$110 a week, obviously would be entitled to the \$150 weekly indemnity.

Clarence N. Sayen: I'd like to clarify another point right here. In the case of the airline member of NBAA, whose pilots are eligible to participate, those pilots also may be members of the ALPA's disability program. They may also be members of another occupational disability program on

the market. Would these pilots be eligible for three different occupational-disability programs, which, taken in conjunction, present them with considerably more income, than they have been accustomed to receive? Could they collect from all three programs simultaneously?

William R. Vance: Technically, yes.

Clarence N. Sayen: They can collect from all three programs?

Henry W. Boggess: *I'd say that it would depend upon the policy of each insurance company.*

Clarence N. Sayen: Quite a number of members of ALPA who have the ALPA policy also have a policy that pays a \$25,000 cash settlement on loss of certificate and who would now be eligible to participate in your program. Those pilots, of course, would be eligible for the \$200 weekly indemnity benefits which I figure to be \$10,400 a year, and then receive \$6,000 from ALPA's program, or \$16,400 a year, and then \$25,000 in cash payments. If my answer's correct, they could collect from all three.

William R. Vance: Well, I think that is a very pertinent point and it certainly presents an underwriting problem which possibly would have to be watched very closely.

Clarence N. Sayen: Our indemnity payments are independent of income from all other sources, so under the ALPA's program they could collect, despite any income from any other source except airline flying. They can't collect from our program and receive income for airline flying simultaneously.

William R. Vance: Well, the same thing would be basically applicable in the NBAA program. It becomes primarily an underwriting problem. For example, in our plan of accepting airline pilots, we would examine their applications to see if their selection of weekly benefits would exceed the amount covered in your program which is a flat sum. In every instance, we know what it is and in the case of a captain or a co-pilot, it would not exceed their annual wages.

Clarence N. Sayen: But you would have no authority as an underwriter to reduce their income unless the master contract of NBAA gives you that privilege.

William R. Vance: We wouldn't reduce their income, Mr. Sayen, we would, in underwriting the risk, merely examine the amount of weekly income that they had applied for to see if, with your \$500 a month, it exceeded their annual income, since we know approximately what salaries captains and co-pilots earn with the airlines.

Jean H. DuBuque (Executive Director, National Business Aircraft Association, Inc.): I'd like to refer to Mr. Boggess' previous point regarding a pilot changing employment. Assuming that this pilot resigned from his job to accept one with another NBAA member at a higher salary, what adjustments could be made in the policy, in that event? Would it be made during the term of the policy, or would it be made at renewal time?

William R. Vance: In the event of a business recession, change of occupation or employer, a pilot may have taken a loss in income. As long as his statement at the

time of the original application was valid for the amount of income he purchased, he would be paid that amount rather than the reduced amount that he might currently be working for when a claim is filed. Inversely, if he was working as a co-pilot and then suddenly was raised to the position of captain, with an increase in salary, he could make application for the additional amount of coverage and his policy would be so indorsed and an additional premium charged for it.

Jean H. DuBuque: There's been considerable discussion regarding the number of benefits and the various advantages provided by this type of pilot insurance. Perhaps it would be wise at this point to outline briefly the background developments that resulted in NBAA deciding to offer this particular insurance program. It was originally the outgrowth of a large number of requests from NBAA members regarding the need for the NBAA to sponsor a group insurance policy covering loss of pilot medical certificate due to physical disability. It is somewhat similar—as has been pointed out—to the pilot insurance provided by the ALPA. NBAA has made a thorough investigation of the coverage, starting approximately two years ago. At that time, a special insurance committee was established by President Boggess to explore all aspects of aviation insurance coverage in this field, bearing in mind that our objective was to obtain the most beneficial protection at the lowest possible premium. The nation-wide interest so far expressed by business pilots in the NBAA policy certainly indicates an evident need for such coverage.

Henry W. Boggess: *There's another point that I do not think we've touched upon. When the NBAA board of directors began to look into the possibility of getting this coverage, the only coverage then available was through Lloyds of London. Now, all of our corporations who are members probably have variable forms of coverage that are obtainable only through the Lloyds of London. Nevertheless our board was most anxious to get an American insurance company to accept this risk. One of the delays in offering the program has been due to getting that done. We believe that it is a step for the benefit of all airmen in trying to get coverage on this side of the Atlantic. We're very hopeful that our experience will enure to the benefit of all professional pilots, whether they be on the airlines or whether they be in business, or even private pilots. As we begin to acquire a wider experience in the field, and more statistics are developed, it is possible that insurance premiums will gradually come down, there's a great deal of the public—and I'm sure that when I say public I include the insurance companies—that believe aviation is a very hazardous business. When we look at the facts and the figures of actual fatalities in airplanes—business planes or airliners—those fatalities are very small compared to automobile fatalities.*

Clarence N. Sayen: I might echo somewhat the remarks of Mr. DuBuque on the desirability of occupational disability insurance for airline pilots. The ALPA board of directors authorized research on this subject in 1952 which culminated in our program being established in November,

1953. We now have approximately two-and-a-half years experience with it, and, by and large, the airline pilot regards this protection as being an extremely basic protection to his whole professional career. It probably has removed more feeling of insecurity among professional pilots than anything we've done during the 25 years' history of our organization. We call it by a good many terms—I think as appropriate a term as any would be "catastrophe insurance for the individual who is badly disabled." We have a number of people now who are wheel-chair cases, etc., and this is their source of income. Rehabilitation insurance is essential for the individual who has been a professional pilot all of his life and suddenly has to pick up at a very advanced age and possibly learn another way of making a living. It's been extremely valuable protection. We realized, when we went into it, as we do today, that there are a good many variables involved and that we don't have all of the answers yet. We know a lot more now than we did two-and-a-half or three years ago. We're gradually getting an accumulation of good statistics. You might be interested in some of them and probably your members would. As of March 31, 1956, we had 8,863 participants in our program. We had considered 43 claims. There are various statistics available on the nature of those claims—what they have stemmed from; the sort of thing that is disabling the airline pilot—and so on, which will prove extremely valuable as the years go by. The statistics to date are not sufficient to make any long-term judgments. Two and a half years isn't enough experience. What we wanted to do in our program was to provide the broadest possible coverage at the lowest possible cost, just as NBAA intends to do. Experience will be the determining factor in whether we were going to limit the coverage or raise the cost. And, our own members will finally make the determination as to how much coverage they can afford in relation to how much they are willing to pay for it. I can't stress too much the importance to the pilot of having this sort of protection available to him.

Henry W. Boggess: *Bill, I think you may have some information you could give for the record on lump-sum settlement in lieu of weekly indemnity.*

William R. Vance: Quite obviously, payment in a lump-sum settlement is simple for underwriters, because they don't have to establish the trust payment method of disbursing the fund over the period of years. This reduces their cost of handling the claim and is always attractive where it's a clear-cut case of a total loss.

Henry W. Boggess: *Actually, he may not lose an airman's medical certificate because it's issued on a six-months' or yearly basis, but he becomes ineligible under the law to fly unless he is physically able to do so. The minute that is established, that's when the waiting period begins.*

William R. Vance: It is also obvious that if this pilot had visited a CAA examiner instead of a regular doctor on that day, he would have been grounded. This would have been substantiation for the claim. Temporary benefits under his contract, of course, would be paid. Since they would be spelled out in the certificate of insur-

ance that he received. Clearly, it is impossible to include detailed answers to every question in a simple brochure that has to be mailed, and is limited in weight, bulk, and size. I think that what we need is continuous dissemination of information to members as questions arise, and revision of the brochure as it is reprinted to cover items that come up frequently. Certainly, in the initial effort, we cannot anticipate all questions.

Clarence N. Sayen: Is there a natural deterioration exclusion in this policy?

William R. Vance: No, except for the decreased benefits after age 51, for sickness only.

Clarence N. Sayen: In ALPA's program,

we did not desire, nor would we approve, a clause on natural deterioration. Neither would we approve a clause which reduced the benefits or increased the rates for the man during his normal flying career, which we believe extends to 60 or beyond. As you know, we now have some pilots over 60 still flying. Similarly, we wanted more complete coverage for occupational disability from any cause, such as sickness or accident. I think it would be a most welcome situation if some of the American insurance companies would begin to take a realistic view of some of the entire insurance problems of pilots, and review their whole underwriting procedures. In my opinion, the

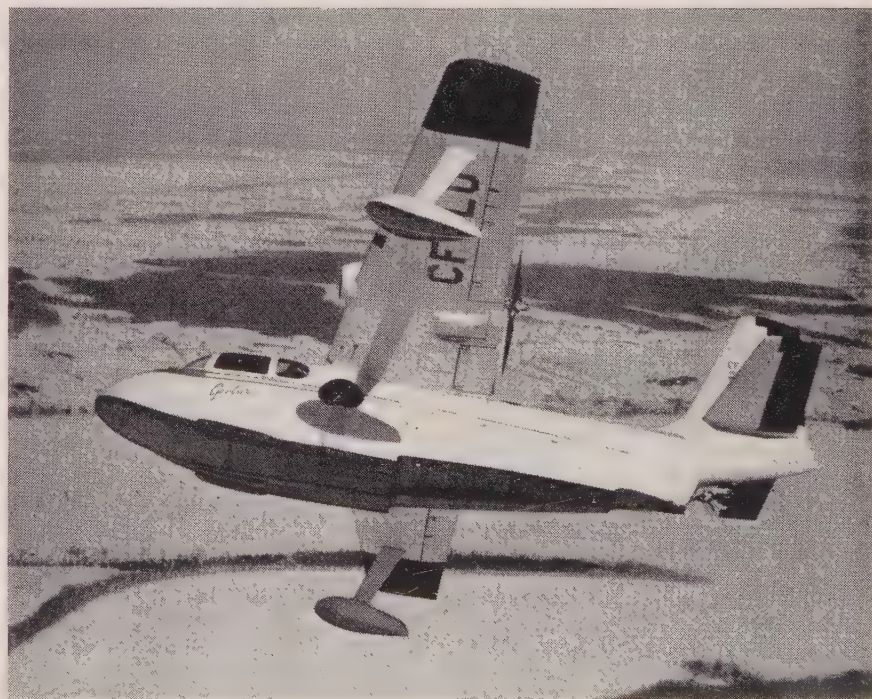
(Continued on page 44)

Royal AMPHIBIAN NEWS



Notes on America's outstanding utility amphibian for business flying and charter service operation

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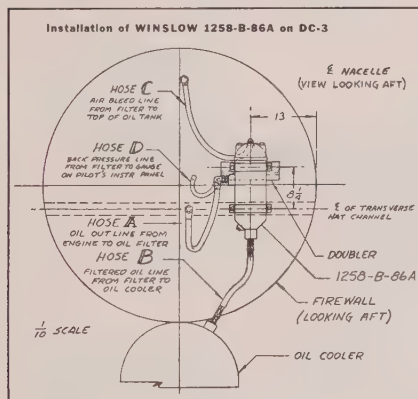
FUELS-OILS

Features and Facts Pertinent to Successful Flight Operations

Winslow Full Flow Oil Filter: How Good Is It, Really?

Business aircraft operators all across the country are either becoming familiar with or beginning to ask questions about one of the most provocative aircraft maintenance accessories that has come along in many a year.

The device is the new full-flow lube oil filter of the Winslow Engineering Co. of



Oakland, Calif. Here is the story of the Winslow filter's development and the first public presentation of detailed results of tests to which the Winslow filter has been subjected.

AN OLD HAND

First of all, Winslow may be a new name to many aircraft operators, but it is not a new name at all in the fuel-filter business generally. Some operators in the executive fleet, as a matter of fact, might recall the name without too much joy from the company's initial entry into the aviation field, some time ago, with a bleeder-type filter. It got CAA approval, all right but in operation was found to clog entirely too fast for practical use. The picture changed in June, 1953, when the company went to Pratt & Whitney for co-operation in figuring out the filter system that has led to its new model.

When Winslow engineers came up with their final answers, the Pacific-Alaska division of Pan Am tested it in the Pratt & Whitney R4360's of its Boeing fleet.

It worked.

Since then, Lockheed, United Air Lines, Southwest, and Resort have undertaken test programs on the filter with an eye to major installation programs.

But it is not among the airlines that the most interest or acceptance is being shown by any means. The executive fleet is swinging ahead even more rapidly in putting the new filter through its paces.

Utility aircraft of such companies as Johns Manville, Webb & Knapp, Union Carbide, Monsanto, General Mills, Tennessee Gas Transmission, Jones & Laughlin Steel, Burroughs Corp., and National Automotive Fibers are using the filter.

The problems of such a filter installation are well known, of course. First there is the question of space and weight. Then comes the question of whether the filter can function long enough, without clogging, to be of practical value. Many filters, in the past, have been plugged after 10-hours' use.

The Winslow filter turns in 150 hours of performance without plugging or change of filter elements. That means possible extension of oil-drain periods up to 150 hrs!

When it comes to space, the size for a DC-3 installation measures about six inches in diameter and 20 inches long.

TYPICAL WEIGHTS

Weight, for some typical installations is: In the Continental R-670 engine of a Stearman, weight is about nine and three-quarters pounds.

The same weight applies for Lycoming R-680's for Stearman's and Cessnas, and for P & W R-985's in Beaver, Stearman, N3N, Beech, and Sikorsky aircraft.

An R-1820 for a Lodestar or DC-3 would take a filter of 15-pounds weight. Heavier, 20-pound filters, take care of Martin 202, 404, PV's and Convairs with R-2800's. (Installations for D-18S and E-18S Beeches are being worked out.)

The Winslow system is a full-flow unit in the exact sense of that phrase: it filters all of the oil leaving the engine and before it reaches the oil radiator.

The filter elements themselves are based on a patented cotton thread and wood fiber combination with a filler of coarser material that permits the elements to pass hot or cold oils *directly* through the filter, rather than through a by-pass even under contaminated filter conditions. The nature of the filter elements is such that they naturally compensate to maintain constant pressure at all times.

Announcements of the filters have made much of the fact that, in an R-4360, for instance, the filter removed more than 78 pounds of solids in 1,200 hours, during which time the filter elements were replaced but eight times.

UTILITY PLANE DATA

Actually, there are test results that will be of far greater interest to executive-plane operators who have long felt that oil filtration may hold the key to one of the greatest remaining steps toward greater life and maintenance economy.

For some time now, a group of aircraft used for crop dusting have been using the Winslow filter in R-985, R-1430, and Wright R-975 engines. One of the R-985's has been completely disassembled after being removed from the Stearman duster in which it had been used. It had logged 957 hours of flight service.

Oil used was Union's Aero 120 Redline and the fuel was 80-87. Oil element changes, drain periods, and main oil screen cleanings were at 100 hours.

These were the test results obtained:

There was no wear in *any* cylinder of the engine of greater than .0025 inches.

Wear of .004 inches was recorded for similar engines *not* using a filter—and with slightly less flight time!

Of the standard P&W choke, the cylinder-bore profile in the filter-fitted engine showed that 67% of the original choke was retained. To find no choke at all is a not uncommon experience in similar engines after such usage.

Parts or cylinder-processing for average wear in such an engine, *without* the filter, could have run from \$200 to above \$400.

In the filter-fitted engine, the indium lead coating of the master rod bearing was in perfect condition, and completely reusable. These bearings cost from \$100 to close to \$150 to replace.

None of the exhaust valve guides needed to be replaced. There were none of the usual circumferential scratches often found on the crankpins of engines used in dusting operations.

In the main oil screen, which was checked at disassembly after 57 hours of operation since a previous inspection, it was found that the mesh was completely free and clean—compared to the usual screen clogging after, say, 30 hours of crop dusting operations.

The general condition of the engine showed no lead and sludge deposits in the crankpin bore, prop-shaft bore, and crankshaft oil stand pipes. Exhaust rocker boxes were free of coke, carbon, and sludge.

The link-rod bushing had been rebushed and bored at a previous overhaul and showed no measurable wear when the engine was taken down after the filter testing period.

DOLLAR SAVINGS

Cost of the replacement parts used to complete the major overhaul of the filter-test engine was about \$200, some \$600 less than the minimum overhaul cost on a comparably-flown engine without the filter. (Wear in a crop duster admittedly is greater than in many other usages but, still, the test figures do show a considerable reason for all the interest in the Winslow.)

The cost of replacing the Winslow filter elements during the test in the Stearman was \$30.

Costs of the complete filter units follow this sort of range:

For Continental R-670, Lycoming R-680, WAC R-975, and P & W R-985's, the filters cost \$67.25. P & W R-1340 units cost \$84, while larger installations, up to the WAC R-2600, cost \$140. Larger units are still in design.

Airwork is giving immediate delivery on the filters at all its branches (Arlington, Va., Miami Springs, Fla., Newark, N.J., and Atlanta, Ga.).

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accident report...

Gulf Lodestar Crash in Ohio Charged to Icing

A Lockheed 18-56, N 33366, owned and operated by the Gulf Oil Corporation, crashed northwest of Londonderry, Ohio on December 29, 1955. The wreckage was partially burned by ground fire, and the pilot and copilot, sole occupants, were killed.

The Lodestar was on a nonstop flight from Tulsa, Oklahoma, to Pittsburgh, Pa. The IFR called for Victor Airways 14, 72, and 12, with an estimated elapsed time of four hours. It also showed fuel for 6:15 hours, an en-route altitude of 9,000 feet, alternate Wheeling, West Virginia. Routine position reports were made until over Dayton, Ohio.

The Dayton position report in which the first mention of icing conditions was made was transcribed as follows: "N 366 over Dayton 1200E 9,000 feet estimate over Columbus 1218E Adamsville. (Will make next report from Adamsville.) Request lower altitude light to moderate rime icing." This message was delivered at 1203 to the Indianapolis center who replied, "ATC advises unable approve lower altitude." This reply was delivered to N 366 at 1204.

At 1221 CAA Columbus recorded the following from N 366, "Over Columbus 1220, 9,000 m.s.l. estimate over Adamsville 33 HLG (will make next report via Wheeling). Destination Pittsburgh requesting 5,000 feet m.s.l." At 1224 the following was transmitted to N 366 by Columbus, "ATC unable to approve 5,000 feet m.s.l. or 7,000 feet m.s.l." At 1227 Columbus received from N 366, "Rime ice request lower altitude as soon as possible." And at 1234 N 366 advised Columbus, "Over Adamsville 1233 9,000 feet m.s.l. Adena 47." The pilot was questioned about the Adena estimate and changed it to "Wheeling" (as next reporting point). Also in this communication he reported, "Difficulty maintaining altitude and airspeed request lower altitude." At 1237 Columbus CAA transmitted, "Clearance to descend and maintain 8,000 m.s.l." and the pilot replied, "Leaving 9,000 m.s.l. at 1237E."

All further attempts to communicate with N 366 were unsuccessful. At approximately 1240 witnesses observed the aircraft below the overcast; it was on a westerly heading and was descending although it appeared to be in a normal attitude. Several components were seen to separate from the aircraft before it struck the ground.

The flight was a ferry flight from base at Tulsa to company headquarters at Pittsburgh. Area forecasts applicable to this flight indicated a cold front at the beginning of the period along a line from extreme northwest Indiana to Rantoul-St. Louis-Joplin, thence between Tulsa and Ft. Smith. Light icing was forecast in the clouds in the freezing levels and the base of the freezing level was expected to lower in the cold air to between 2,000 feet and the surface. The freezing level was fore-

cast to be from 10,000 to 12,000 feet m.s.l. with light icing in the clouds above that level in Missouri and southern Illinois and light to moderate in southern and central Indiana and in southern Ohio.

The pilot visited the Weather Bureau at Tulsa on December 28, at which time he received a weather briefing for his proposed flight on the following day. He again visited the Weather Bureau on the morning of December 29 and the meteorologist on duty stated that he spent some time reviewing briefing material, including current reports, upper air, and forecasts pertinent to his flight. His only request for advice from the meteorologist was in regard to the height of the top of the overcast in the Tulsa area. Silva did not request any other weather advice while en route, either from the Weather Bureau or concerning reports from other pilots even after he was encountering ice. The forecast read by him before departing indicated icing above 10,000 feet in eastern Indiana and in Ohio, whereas pilot reports made while he was en route indicated icing encountered in southern Ohio to as low as 8,000 feet.

The area about the scene of the accident was free from snow, and no ice due to precipitation was present. In the immediate vicinity in which the separated components of the aircraft were found, there were many ice chunks of such shape as those that build up on the surfaces of aircraft in flight. The elapsed time and temperature could have reduced their size, which still was reported by witnesses to have been up to eight inches in length and up to two inches in thickness. This ice was hard and milky in appearance and was found only near the tail parts or between those parts and the main wreckage.

The aircraft was equipped for deicing of carburetor, windshield, and propeller blades with alcohol but there was no deicer equipment on the wings or tail surfaces. The company's policy was to avoid icing conditions as much as possible.

The last known course flown by N 366 was eastbound along V-12, which route is 84 degrees magnetic. In striking the ground the aircraft cut a swath through trees on a heading of 252 degrees magnetic and at a steep angle. The vertical surfaces of the tail group were recovered from a point 1 to 1½ mile eastward (70 degrees magnetic) of the main wreckage. So much of the wreckage was completely demolished by the impact and fire that the most significant items of information gained from its examination were the attitude of the aircraft at time of impact, the direction of its movement, the presence of ice, and the separate location of the detached components.

A cold front extended southwestward from eastern Lake Superior through Wisconsin, Illinois, Missouri, and Oklahoma. The front reached Indianapolis about the same time the flight passed over that area. Below freezing temperatures, with icing

likely, began at or soon after passing Indianapolis. Thence to Londonderry variable icing was indicated at 9,000 feet ranging from light to at times possibly heavy and as low as 8,000 feet in southern Ohio. Some light precipitation existed en route, mostly in the form of drizzle. Cloud tops were 12,000 feet and higher from St. Louis to southern Ohio ahead of the front, with ceilings of the lowest layers mostly 2,000 feet or better but locally as low as 500 feet.

The record of communications was that over Dayton, Ohio, at 9,000 feet the pilot reported light to moderate icing conditions and requested a lower altitude; that was his first mention of icing and his first request for lower altitude. He again mentioned icing and requested a lower altitude over Columbus at 1220, and 1227 he reported rime ice and requested a lower altitude as soon as possible. Without wing and tail deicers he had no means of removing ice from those surfaces except by escape from the icing conditions, i.e. to another altitude. Although icing was forecast for only the altitudes from 10,000 feet up, it actually occurred at altitudes as low as 8,000 feet. After flying in an icing condition in excess of 30 minutes, the pilot received clearance to descend to 8,000 feet and reported leaving 9,000 feet. This was his last communication.

As shown by his communications the pilot first reported icing conditions in the vicinity of Dayton. These conditions were not in accordance with the forecast he had received. He requested a change to 5,000 feet altitude but other traffic prevented the granting of that and other requests for a lower altitude assignment. If icing conditions and the lack of wing deicers made his problem at that time an urgent one, he did not state that urgency nor did he request additional information on the weather ahead.

On the basis of all available evidence the CAB Investigating Board found that: the flight encountered icing conditions at cruising altitude of 9,000 feet; traffic prevented ARTC from assigning a lower altitude when requested; after the pilot reported difficulty in maintaining airspeed and altitude ARTC assigned the 8,000 foot level; at low altitude the aircraft lost much of the vertical surface in its tail group and struck the ground at a steep angle; no emergency was declared.

The Board determined that the probable cause of this accident was the accumulation of enough ice to result in loss of control and the subsequent shedding of vertical surfaces from the tail group of the aircraft.

Ed. Note: Undoubtedly the pilot should have declared an emergency in fact when it became obvious that ARTC accepted his previous reports as almost routine. But, is it possible that the preponderance of airline aircraft with the most effective anti-icing equipment has dulled ARTC's sensitivity to the icing problems of the pilot?

Windstream Analysis

(Continued from page 15)

the distance between them. This wind does not actually blow. Neither is it an abstract, theoretical entity, but may be thought of as the uncorrected force, or raw material, from which the gradient wind is established. Geostrophic wind may be solved on recent models of navigation computers, or by a number of short-cut methods. Where the distance measurements are taken perpendicularly between two adjacent contours (200 feet of height change), the geostrophic wind may be found, on any time and distance computer, by dividing a multiple ("K" factor times 200 feet), by the measured distance between the contours in nautical miles. These multiples are 8600, 7500, 6700, 6100, and 5600, for respective latitudes 30°, 35°, 40°, 45°, and 50°.

Gradient wind is geostrophic wind corrected for *radius of trajectory*. The speed of any air particle in circular motion is affected by centrifugal force. The exerted force is a product of the speed of the air particle, the arm of rotation, a latitude factor, and the motion of the pressure system relative to the air particle. These corrections are quite easily applied by reference to meteorological tables. Essentially-straight contour heights require no correction, whereas appreciable correction must be made for radically-curved contours, as this curvature comprises the greater part of the arm of rotation. The corrections around a low pressure system are considerable, serving to *reduce* a 60 knot geostrophic wind to 40 knots at a distance of 200 N.M. from the center of a stationary, symmetrical low pressure system at 45° N. Latitude. Inasmuch as pressure is directly proportional to absolute temperature, wind force may also be expressed as a function of temperature gradient. The collection of colder air in the central portion of the low quite often produces a strong temperature gradient, or *thermal packing*, at the outer fringes of the cold air, resulting in the existence of maximum wind force, not at the low center, but in the area a few contours removed from the center. The corrections applied to circulation around a high pressure area are relatively minor, and

serve to *increase* slightly the geostrophic wind force. Millibar charts may then be visualized two-dimensionally as constant-altitude windstream charts, with air flow circulating parallel to the contours according to Buys Ballot's law, and wind force modified as outlined above. Any rule of thumb involving changes of velocity with altitude should be disregarded.

Prognostic charts with a short forecast-period, enabling coincidence with the time of the flight, are desirable for pressure-pattern work. The thirty-six hour 700 mb prognostic chart currently being issued, is too far in the future to be of appreciable value to the executive pilot. No prognostic chart is issued for the 850 mb level. The domestic air carriers overcome these limitations by maintaining their own meteorological departments. Tentative Weather Bureau plans, if inaugurated, may offer a solution to this problem. The *actual* millibar charts, even though several hours old, constitute the only complete picture of air flow at a given level over the entire United States. This information, if correctly interpreted, will determine if the effort involved in constructing a minimum-time track will be justified. Not all situations are conducive to advantageous pressure-pattern flight, and the ability to evaluate the fundamental principles will save needless work.

Preliminary inspection should be made to ascertain the variation in wind force, and the pattern of wind direction. Very little benefit will be realized by flying a minimal time track with a weak wind of 20 knots or less, as illustrated by the poorly-defined pattern in case 1, figure 2. Fairly strong winds in excess of 30-35 knots are necessary to achieve an appreciable advantage. No benefit will be realized in calm air, or where the wind force and direction is constant. The primary requirement is that *there must be a substantial change over the general area in either wind direction, wind force, or in both*. The general area is intended to include the area on either side of the direct track, outwards to a lateral distance equivalent to roughly 40% of the direct route mileage. These prerequisites will occur more often during the winter months, due to the frequent outbreaks of

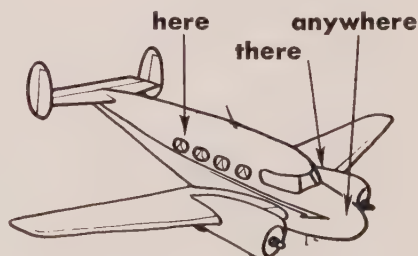
(Continued on page 48)



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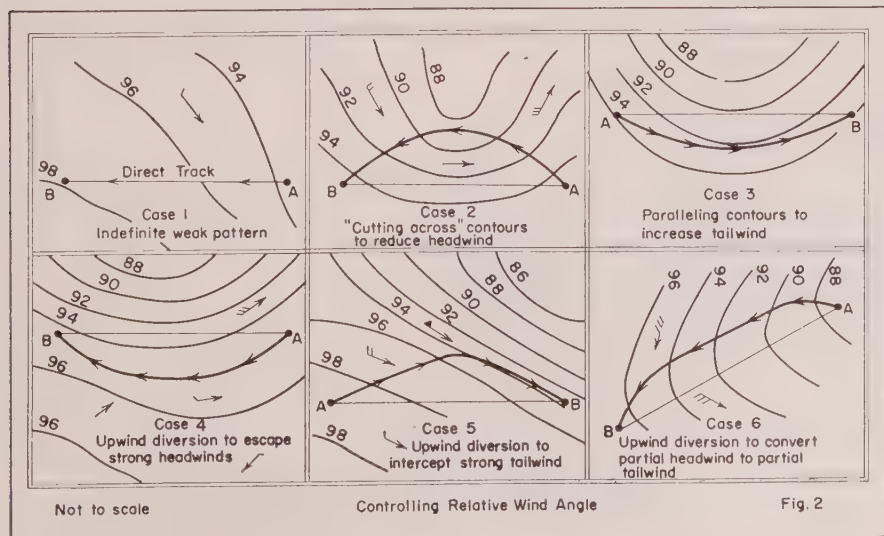
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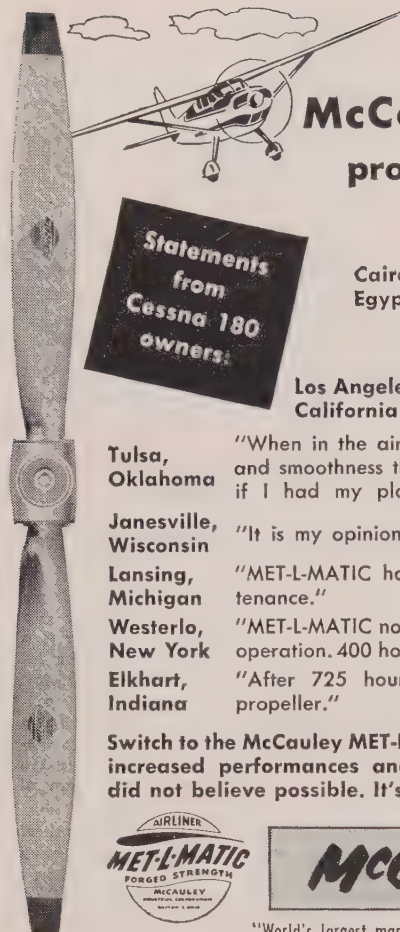
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Skyways Round Table

(Continued from page 39)

American insurance companies' attitude toward life insurance for airline pilots has been off base for a number of years. And it has only been in recent years that we've been able to convince them; in the statistics I saw a couple of days ago, 56% of the life underwriters in the United States now underwrite airline pilots with no loadings. But that's only come about in the last few years, as a result of a lot of our efforts in the insurance field. It's a good development. This disability insurance may now spread from pilots to dentists, doctors, and other groups who have similar occupational disability problems.

William R. Vance: Mr. Sayen, I'd like to comment on one point you made earlier, regarding the carrying of pilots up through and past the age 60. We do carry them to age 60, but felt that in the NBAA we have a basically younger group of pilots. Also, I'd say that approximately 50% of industrial concerns have a policy of moving their pilots over into other jobs as they advance in age, which eliminates a great deal of your group between 50 and 60. I'd say that a good 95 to 97% of the business pilots will be under age 50, and perhaps well under age 50. Consequently we aren't faced with a really critical problem in the older age group. There will be a very small number that will reach age 60 and still be active in the business flying field. As a result, we felt that offering this coverage at a reduced rate would be more desirable if we reduced the benefits for sickness only. We aren't worried about injuries, but by reducing illness benefits starting at age 51, we eliminate the greater hazard in the older age groups. Naturally, we can effect sufficient savings on premiums to make it worth while to the overall group to whom we're offering the insurance. That was our purpose, and it was a deliberate thing on our part.

Clarence N. Sayen: ALPA finds that it gets a good many of your claims in the older group, and it's this group that desires the coverage, probably more than the younger group, and they are willing to pay something extra for it. So, you might increase the rates, rather than reduce the coverage. It is the same thing, so far as the underwriter is concerned.

The average age of all airline pilots, as of March 15th, 1956, was 36.95 years. The average in business flying may not be as great, but there is scarcely a business pilot who has had over 10, 11 or possibly 12 years of business flying. These boys are usually in their early thirties. Many of them in their twenties. But even though they stay in this work, they will not be flying on the average after age 50, which is to be expected.

Jean H. DuBuque: In connection with the age factor, I think it should be recognized clearly that this is an entirely new policy, and that the insurers have had little experience in this field. As their experience grows, there will be automatic adjustments, possibly in age, premiums, benefits, and other aspects of the coverage.

Henry W. Boggess: Are there other remarks or other questions?

William R. Vance: I think frankly that

the group under age 50 will take care of at least 97% of NBAA member pilots. To jeopardize the program for the benefit of a few would, of course, hardly be fair. As this program progresses, and certainly we hope it will progress, obviously we are going to be able to do other things with it, such as broadening the scope of the coverage, perhaps reducing premiums or taking on additional hazards that aren't covered at present, and various other items of that nature. I think we have an adequate program to get into the field. We certainly will be in a position to keep some records of ages, and then see what is needed and, as it is needed, improve the overall coverage.

Henry W. Boggess: *We must bear in mind that there is a reduction of 10% a year, beginning at age 51 up to age 60, which applies only to natural deterioration or sickness, and that so far as catastrophe is concerned, disability resulting from accident or injury, the pilot has full coverage up to age 60.*

Jean H. DuBuque: One of our members, Esso Shipping, has shown a great deal of interest in this insurance program, and this organization is represented here by one of their pilots, Penn Wilson. Without getting into all the provisions and technicalities of NBAA's insurance coverage, Penn, could you give an off-hand expression regarding the reaction of Esso's pilot group toward this particular policy?

Penn Wilson (Chief Pilot, Carter Oil Company): This particular policy has been

turned over to our insurance and legal department to give us advice on it and how it will fit into our own particular company policies. Mr. Boggess mentioned before that companies do have quite a few operating policies of different natures. We do feel that pilots, on the whole, are a proud group. In talking to various pilots, it becomes apparent that they would rather do something themselves for conditions like this, rather than look for charity. A number of plans have been brought forth, in the past, that are more or less of charitable nature, or could be construed as such, but pilots would rather be able to do something for themselves.

Henry W. Boggess: *Is this the type of insurance opportunity you are talking about, Penn?*

Penn Wilson: I certainly think this insurance is along those lines, since it will help pilots to help themselves, rather than ask the company to do it for them.

Henry W. Boggess: *Before we conclude, are there other observations?*

J. V. Swanson: I just want to comment that some of the questions that have come up regarding pilots of greater age will be settled to a great measure by the needs and the comments of the members, just as the needs of the members started this program. Possibly five years from now, or ten years from now, you will have a different figure on the average age of pilots. Each year the NBAA and the insurers intend to get together, and necessary changes can be made to satisfy a lot of these points that cannot

be entirely satisfied when the plan is starting. You do have to have a starting point, and from there you can work toward improving the program.

Henry W. Boggess: *Again, it is evolutionary, and we need experience and time to establish both rates and conditions to be met. Mr. Sayen, did you have another observation?*

Clarence N. Sayen: When is this plan scheduled to go into effect?

Henry W. Boggess: *It is in effect now, and applications are available. We have mailed a brochure and a question and answer sheet that will make the coverage intelligible to the individual member pilot so that he can determine whether or not he wants to subscribe.*

Penn Wilson: There was one item that arose in a company meeting I attended in New York. I don't know where the statistics were obtained, but I believe they possibly came from the airlines. The item was on this age limit that you have been talking about. When a man reaches 50 years of age, he is less likely to be pulled out of the cockpit than before 50. In other words, if he gets by physically until he is 50, his possibilities of stepping out of the cockpit before 60 are greatly reduced.

Henry W. Boggess: *We anticipate that there will be many modifications as time goes on, both by demand of the pilots and as a result of economic experience. Let me thank each of you on behalf of SKYWAYS for participating in this informative round table.*



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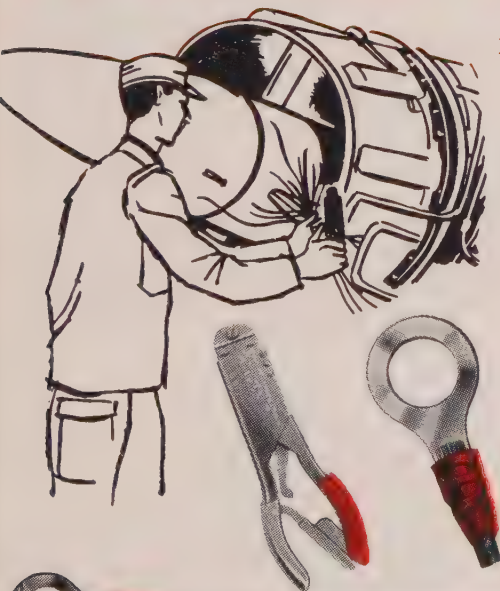
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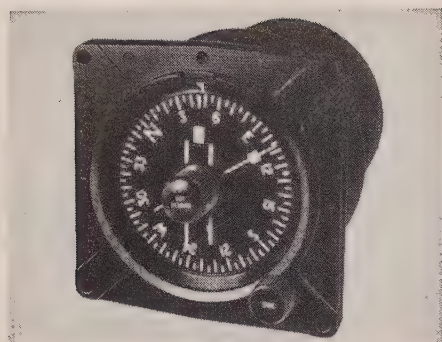
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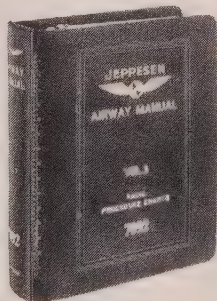
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NBAA

(Continued from page 34)

CAB Proposes Inauguration Of Minimum Airspace Program

To meet requirements for high-speed high-altitude plane movements and to avoid collisions at high closing rates under all weather conditions "demands positive control at all times," the CAA contends. As the first step toward this objective CAA has proposed that a minimum program for control of all airspace above 24,000 be inaugurated initially, and "it is possible that the floor may be lowered as experience is gained."

In the initial phase, 39 operational points are to be set up in 24 of the 26 air traffic control centers. Two sectors are to be set up in each of 15 centers operating 16 hours a day separately and 8 hours a day on combined status. The other nine sectors are to operate 24 hours a day.

CAA's plan requires 330 operating positions with 90 provided within basic formula requirements for control of flights on airways above 24,000 feet. Therefore, 240 additional operating positions are being requested to start control, at a cost of \$699,779 for personnel services, etc. Existing center terminal communications equipment in new sectors will be required, at a cost of \$71,700. Communication lines connecting centers to peripheral communications sites will need 7940 additional miles of lines for an average of six months, at a cost of \$226,290. Maintenance of peripheral communications will establish 10 new positions at \$48,871.

Check NOTAM File To Avoid Restricted Areas

A very disturbed and shaken business pilot recently called a Flight Service Center to report a flight of fighters had buzzed dangerously close to his aircraft. Their approach had been so fast and sudden that evasive action was impossible. Further conversation with the pilot revealed the reason for the 'reckless' maneuvers of the military planes. They were making a high-speed bomb run in an established and well-defined restricted area. When told of this, the complaining civil pilot expressed surprise. He had not been aware that a dangerous and active restricted area lay across his path of flight!

In another instance, a twin-engine aircraft flew through a dive bombing range. Two F-84Fs were in the middle of a high altitude dive bombing run when this twin-engine civil aircraft suddenly appeared under them. Only quick action on the part of the lead fighter pilot prevented a collision.

And just one hour later, another twin-engine aircraft flew through the same range during another bombing run, at approximately the same altitude and heading.

In one month a total of five violations were chalked up on this one range alone. Other aircraft may have slipped through unnoticed.

Why do pilots fly through restricted areas when hazards to flight are known to

exist? The answers run all the way from 'I forgot,' to 'What restricted area?'

Check the NOTAM file for special information pertaining to restricted areas, hours of operation and type of activity in progress.

"Plan your flight . . . and enjoy it!"

New RTCA Committee to Study Jet-Radio Needs

The Radio Technical Commission for Aeronautics has appointed a new Special Committee (SC-76) to study operational requirements for jet aircraft and high altitude operations.

Such requirements have been broadly stated in various studies and reports, but they have not been set forth in sufficient detail to permit the development of required aids to navigation, communication, and air traffic control.

An urgent need exists to define these requirements in terms of the performance characteristics and the operational environments of the types of aircraft involved, with respect to: (1) route patterns in both airway and off-airway areas, (2) accuracy and coverage of navigational guidance needed, (3) let-down, approach, and landing procedures, and (4) air traffic control.

Organization of the membership of SC-76 is being completed, and will include representatives of all segments of aviation concerned with the problems under study. NBAA will serve as a member of this committee.

CAA Group to Study Expected Jet-Transport Problems

The CAA has established a jet-age planning group to work with industry and Government on problems which civil jet transports are expected to create. The group's starting point is a preliminary list of 100 problems, developed as a result of the CAA jet symposium called last January by Administrator Charles J. Lowen.

To keep all concerned informed on progress made and problems remaining, the CAA will issue a quarterly report on the group's activity.

Representatives from the CAA Offices of Airports, Safety and Airways will report to a central coordinator for the group.

The special planning group will study such varied questions as the effect on jet engine operation of foreign material picked up from runways; effect of reverse thrust on pavement; and procedures for emergency dumping of fuel.

"This is another important step in our program of preparations for the jet age," Administrator Lowen said. "We have less than three years to make plans and complete the facilities initially required, and we mean to do everything within our power to get ready during that time. In cooperation with the aviation industry, we look forward to new highs of safety and service with jets."

National Business Aircraft Association will lend assistance to the CAA planning group in connection with future business aircraft jet operations requirements.

Air Taxi

(Continued from page 30)

been set up, each 25 miles wide. Fares begin at a minimum of \$15 for the inner zone and rise to a maximum of \$180 at the 225-mile radius. Beyond this the straight mileage rate for the aircraft applies.

A North Carolina operator lists round trips to resorts as far away as Jacksonville and Miami, Fla., indicating that he has frequent trips to these and other distant points. Charter rates, which are based on the aircraft employed indicate costs, even in a three-passenger plane, which are fairly comparable to scheduled airline tariffs.

On this point an Indiana user, noting that prospects often seem shocked by air taxi rates, points out that ground taxicabs charge from 50 to 60¢ a mile, plus extra tariffs for additional passengers. For the same rates, he says, one can hire a Beech, Cessna or Aero Commander, capable of carrying four passengers. For half these rates he adds, one can charter a three-passenger plane that will take you to your home airport direct from the air terminal in a matter of minutes instead of hours, eliminating ground travel, traffic congestion and parking problems.

Air taxi operators want to enhance the versatility, and hence, the usefulness of their services by adding helicopters. With rotary-wing aircraft, they can get "closer in" to the customer's home or business. They might even be able to save some

ground transportation costs, the operators say.

The current price of helicopters, and the capacity they offer, stays their hands. But if business and profits continue to show their present upward trend, some of the operators may take the plunge into rotary-wing operations. Many of them seem impressed by the performance and load of Cessna's CH-1 helicopter, which gives promise for availability in the commercial field.

By The Numbers

(Continued from page 16)

the 90,000 series. N 90400 was the beginning of the DC-4 roster and in the pre-war days N 16001 through N 16013 identified their famous Douglas DST sleeper planes assigned principally to their fast coast-to-coast Mercury flights.

Flying clubs and groups such as the Flying Farmers often request blocks of special numbers. Members of the Flying Farmers get the numbers ending in F and officers the FF identification.

"That brings up a sad point," says Heath. "People can't seem to understand that if a single letter is assigned to a number, a double letter can't be assigned to the same number."

"The reason is that the card index machines can't distinguish between one F and two F's. Wouldn't you think a person could understand that? But, no, people think any machine must be just as bright

as they are."

When an aircraft owner gets a sudden yen for a special number, the CAA has a very simple procedure outlined. Aviation Safety Release No. 378 of August 15, 1953 says:

"All requests for issuance of special registration numbers shall be made direct to the Administrative and Records Branch, W-240, Aircraft Engineering Division, CAA, Washington 25, D.C., and should be accompanied by a check or money order, made payable to the Treasurer of the United States, in the amount of \$10.00 for each special number desired."

Occasionally an aircraft owner seeking something in the way of a special number will visit the CAA offices in person. Nothing definite in mind . . . just a special number.

"Some people think we run sort of a shopping center," Heath adds.

"We try to be helpful, and we'll tell anyone if a particular number is available. But when they want to paw through the files looking for a nice number that's loose, that's going too far. They can't handle the merchandise."

Whether it's bad memory, superstition, cattle brands or product names—those who request special numbers usually have good reason behind their application . . . and flying the airways is a B-23 executive ship with one of the most logical reasons of all. The ship is owned by National Distiller Products Corp. . . . and the number?

100 P(roof)!



DALLAS AERO MODIFIES A DOVE



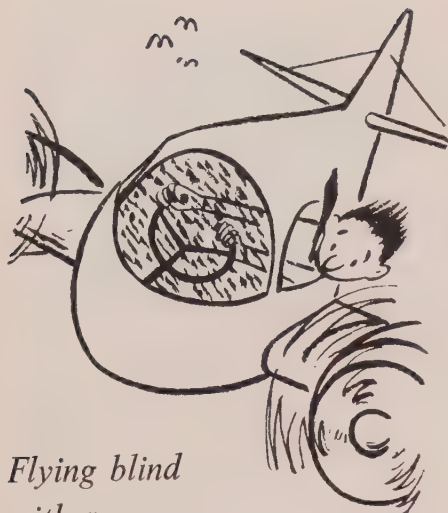
A thorough modification of the Western Company's de Havilland Dove has been completed by Dallas Aero Service. Included in the conversion were the installation of the DAS augmentor system, south wind heaters, long range fuel tanks, alcohol tank and electric pump, airline type flashing system and rotating beacon, electric primer system, oxygen system, and the Dallas Aero engineered, designed and fabricated Air Stair Door.

The prefabricated DAS Air Stair is now available for owners of Doves as well as Twin Beechcraft and other types of airplanes. Safe, economical and convenient, the Air Stair is another new feature of the complete service provided by Dallas Aero Service.

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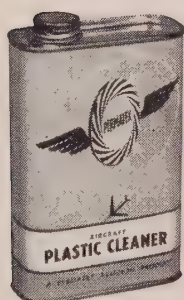
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Windstream Analysis

(Continued from page 43)

polar air from Canada at that time, and are ordinarily denoted by:

- (1) Closed circulation aloft (circular contours), or
- (2) A series of adjacent contours whose curvature approaches or exceeds 90° within the general area of the flight, or
- (3) Closely-packed contours existing only in a particular area.

The presence of a low pressure system along track is not necessary in order to meet the requirements. If the situation is conducive to pressure-pattern technique, it is desirable to locate the approximate area in which the minimum time track will fall, in order to eliminate a portion of the work to follow.

Flight over a minimum-time track might also be defined as the science of controlling the relative wind angle in such a manner that the rate of gain in ground-speed exceeds, to a maximum degree, the rate of increase in mileage occasioned by the associated diversion from the most-direct track. If the heading of the aircraft is controlled to place the wind direction near or aft of the wingtip, rather than near the nose, a substantial increase in ground-speed will result. In order to accomplish this, the minimum-time track will tend to "cut across" the contour heights in an effort to reduce headwinds (case 2, figure 2.), and parallel the contours when flying downwind to achieve the maximum favorable tailwind (case 3.) In either situation, regardless of wind direction, the aircraft must turn downwind to increase ground-speed. *The minimum-time track will then lie in the direction towards which the wind is blowing, left or right, when viewed from departure point A towards destination B.* The exception to this rule occurs when the least-time track ignores a small advantage at the beginning of the flight in order to later achieve a greater benefit by flight through an area of more-pronounced, influencing wind. This may occur as a function of wind force, as illustrated by cases 4 and 5, or as a function of wind direction as shown by case 6. An understanding of the involved principles, and the ability to judge the relative effect of different wind forces, is necessary to determine these exceptions.

The minimum time track may change directions several times after the initial direction, creating an infinite number of possible combinations, and can rarely be determined by inspection. These tracks have been known to cross and re-cross the direct track in an S shaped pattern. This is not likely to occur in executive operations because of the shorter distances involved. Differences in wind direction between successive levels is created primarily by the "trailing" feature of the low aloft, or its tendency to lean towards the colder air. Both millibara levels should be examined for the possibility of securing a secondary advantage through a split-altitude flight plan.

The previous requirements of wind force and direction changes, and observations on the minimum-time track, are valid only for

aircraft in the speed range 140-200 knots, operating over distances from 750 N.M. to 1400 N.M., and should not be applied to any other operation. A vectorial solution for the minimum time-track, using a forecast wind field, will be outlined in a following article.



How Business Aircraft Can Simplify Company Operations

(Continued from page 13)

Ferry Pilot, and holds an ATR and Flight Navigators rating.

The extensive flying backgrounds of all these pilots is evident. Company policy requires that each pilot have a commercial with single and multi-engine ratings and the more experience they have the better the Company likes it. When an executive or passenger enter one of the Sprague planes, he is assured of being flown safely by a competent pilot.

The pilots keep a sharp eye on the flight schedule board to find out the who, when, where, and why of their flying day. The board shows time of take-off, destination, departure time for return, passengers, and any other pertinent information. A check of the board quickly tells where the planes are being flown and the nature of the flights. Sprague pilots must notify the Flight Department of any delays in their schedule. The Flight Department operates under the CAA rule of checking on any aircraft overdue by one hour.

After a pilot terminates a flight, his work is still far from being finished. It is then that the desk work involved in operating a Flight Department begins. Careful records are kept of gasoline, oil, repairs, maintenance, storage, parts, and other equipment. Operating expenses are tabulated monthly. Records of flight time are maintained monthly for each plane and each pilot. Annually, an operating expense report is prepared for all airplanes. Finally, when the "book work" is done, the pilots, who have been thoroughly instructed in aircraft and engine maintenance, frequently assist a mechanic in servicing or maintaining the aircraft so that they are familiar with the complete condition of the planes.

With four airplanes and six pilots flying about 2800-3000 hours a year, and a strict policy of safety-first, the Sprague Electric Company has taken to business flying in a big way and is thoroughly convinced that it is paying off in much bigger ways.



Turn Back to Page 10!

Be sure you have all the facts about the

- N.B.A.A.
- Ninth Annual Forum
- Miami, Florida
- October 23, 24, 25.

Devoted to Equipment and Service Needs of Executive and Utility Aircraft

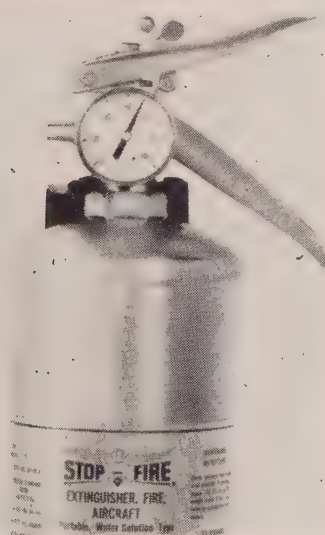
THE SQUAWK SHEET

An airline aircraft recently experienced a landing gear wheel explosion after taxiing back to the ramp after an aborted takeoff. An engine fire warning caused the discontinued take-off and both *moderate braking* and reversed thrust were used to stop the aircraft. Only light braking action was used returning to the ramp.

At the ramp, a lineman observed that one main wheel assembly was hot and smoking. He applied CO₂. A few seconds later, the wheel assembly exploded, blowing the axle nut off and a portion of wheel (96#) followed, went through a loading gate structure and stopped 585 ft away! The No. 2 tire of the double-gear then blew, ruptured a hydraulic fitting, starting a fire which airport firemen extinguished with dry chemical.

So—whenever brakes appear overheated to the extent that fire extinguishing is indicated, use a dry chemical agent if possible. In any case, stand behind or forward of the wheel, and if using CO₂ or water, several feet away! Smothering action without excessively fast cooling should then be possible.

New 1½ Qt. Extinguisher For Class A Aircraft Fires



Designated the Stop-Fire AT-22-A, the 1½ qt water-solution unit by Stop-Fire, Inc., Brooklyn, N.Y., is the *first* hand portable water-solution type to be approved by Underwriters Laboratories, Inc., for use in aircraft for control of incipient Class A fires. In addition, it meets the recommen-

dations of the National Fire Protection Assoc.'s Committee on Aviation and Airport Fire Protection and conforms to CAA's TSO C19A for Type I, Category A, water-solution type hand fire extinguishers for airplane cabin interiors.

The Stop-Fire device is a stored pressure, loaded stream fire extinguisher. The solution is Stop-Fire Technite, a specially developed fortified anti-freeze solution shown to have fire-cooling and quenching power far beyond that of plain water. It is non-toxic and, on contact with fire, will not produce injurious fumes. Easily operated with one hand, the forceful stream carries in excess of 30 feet, and by means of a flexible syphon tube, permits effective operation over an arc of 160° from one standing position.

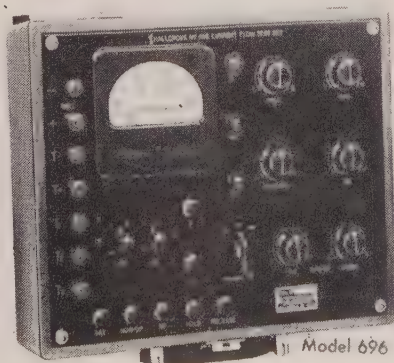
There is no cartridge to be removed and weighed periodically for check; an easy-to-read pressure gauge permits quick visual inspection.

Servicing is simpler because the unit may be refilled directly thru the handy filler plug, eliminating need for unit disassembly. Moreover, the unit may be recharged, directly through the nozzle opening, from standard bulk pressurizing equipment. Operation is assured in temperatures from -40°F to plus 40°F. Construction is corrosion-resistant and withstands burst pressures exceeding 900 psi. A safety seal prevents accidental discharge yet breaks easily for use. Mounting bracket is included.

Current Flow Tester Speeds Relay Checking

A new series of instruments which speed and simplify checking and adjustments of relays, solenoids, stepping switches, and similar electro-mechanical devices has just been announced by Shallcross Mfg. Co., Collingdale, Pa.

These testers are used to apply the correct current to relays to check such values as "Operate" (minimum pull-in current); "Non-Operate" (maximum current which will not operate relay); "Release" (current at which relay drops out); "Hold" (minimum current which keeps relay closed);



and "Saturate" (a pre-testing polarization procedure). All the circuits are identified and controlled from the front panel, and each can be quickly adjusted without disturbing the other circuit settings.

Metered current is applied to the relays by depressing one of the corresponding switches. Mechanical adjustment to the relays may be made without disconnecting the unit from the test set, and electrical tests may be repeated without resetting the circuits. The meter may also be used independently as a milliammeter or voltmeter.

16 KV Power Supply Fits In Your Hand

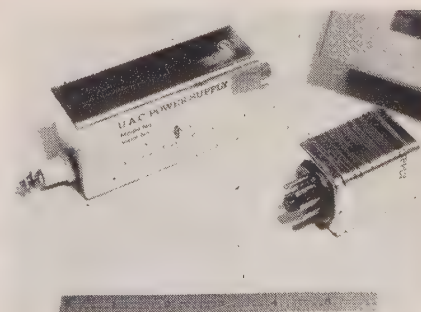
A compact completely electronic transistorized DC to DC power supply that produces 16,000 volts from as little as 3 volts input . . . weighs only 1½ pounds . . . and is only 1½" x 3" x 6" is now available from Universal Atomics Corp., 19 East 48th Street, New York 17, New York.



Also available are units that deliver 16 KV at as much as 200 ua from 12 volts input where more current is desired.

Included in UAC's complete line of more than 50,000 transistorized power supplies are units that give any practical combination of voltage and current up to 50 watts. Custom-made units to 300 watts available.

(Continued on page 51)



FLIGHT ENGINEERS

EASTERN AIR LINES' 381 MILLION DOLLAR PROGRAM INCLUDING TURBO-PROP AND STRAIGHT JETS REQUIRES ADDITIONAL FLIGHT ENGINEERS

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Height: 5'8"-6'4" (without shoes)
Age: 23-32 (Will consider men up to 35 if experience exceeds that listed below.)

Experience: Must have four years diversified aircraft and engine mechanic experience. One year of this experience must be on aircraft with engine rating of at least 800 H.P. In addition, must be able to secure the CAA A&E license.

Preference is given to applicant holding any one of the following additional experience:

1. Holders of current A&E licenses.
2. Have 100 or more certified hours as flight engineer.
3. Have CAA commercial pilot's license with 200 or more certified hours.

Pay while training \$330 per month. After training 1st year \$500 per month with yearly increases up to approximately \$950 per month.

For current and future openings, write immediately detailing personal qualifications, work experience and flight time to:

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INDIANA TECHNICAL COLLEGE

.... in the business hangar

(Continued from page 23)

• Latest innovations in executive aircraft appointments are the Time-Master dictating machine and the Dictet recorder, manufactured by the Dictaphone Corporation for use in flying offices. The Time-Master dictating machine weighs only twelve pounds and is extremely compact; it is available for AC, AC-DC, or, with converters, for use with almost any kind of battery power or voltage system. The Dictet recorder, battery powered, magazine loaded, and using transistors and printed circuits, weighs only 2½ pounds and measures only six inches in its largest dimension. Primarily an on-the-spot recorder, it records for one hour on reusable magnetic tape that can be played back immediately; the same instrument can be used for transcription by plugging in special controls.

• Pilot Hal Muny flew the Hunkin-Conkey Construction Company's deHavilland Dove to Dallas Aero Service for a double engine change, overhaul of both propellers and constant speed units, a 1000-hour inspection and various deHavilland modifications. The same work was done on the deHavilland Dove bought by Frank Vines from Duplate Canada Ltd., Toronto, and in addition the installation of augmentors, 65 gallon auxiliary fuel tank, and heaters. Glasscock Drilling Company's Dove was brought to Dallas for auxiliary tanks, engine overhaul, recovering of fabric control surfaces and exterior repainting. Shell Oil Company's Midland based Dove was flown to Dallas recently by pilot Wally Tingley for double engine overhaul, overhaul of both props and constant speed units, and installation of modernized oil separator and breather system and overhaul of the flight instruments. A right engine change and annual inspection of the Ralph Lowe Lockheed Lodestar from Midland has been completed by Dallas Aero Service. Joe Mims represented the Lowe Company. Brown Paper Company's Piper Apache has had a 140-hour inspection completed by Dallas. Pilot Bob Clark flew the plane from Orange, Texas. A 100-hour inspection was completed on the Aero Commander from Ibex Co., Breckenridge, Tex. Chief Pilot Tony Zuma has flown to Dallas Aero one of Tennessee Gas Transmission Company's B-26's from Houston for a Bendix radar installation and for a dump chute installation. The second B-26 will be flown to Dallas following the completion of work on the first. Pilot William Bradshaw has flown the Canadian Aircraft Renter's Lockheed Lodestar from Toronto to Dallas for a 100-hour inspection. A double engine change, overhaul of props and accessories, and a 1000-hour check have begun on Sun Pipe Line Company's Aero Commander, flown to Dallas Aero Service from Beaumont, Texas, by Pilot Gene Reiger.

• Leo Boyd, pilot for the Tennessee Eastman Co. (Kingsport, Tenn. branch of Eastman Kodak Co.), brought the company's recently purchased DC-3 to Executive Aircraft Service, Dallas, for major overhaul and new interior. Pan-Am Southern Corp.'s Lodestar was brought to Executive from New Orleans by pilots Cliff Conrad and Don Butler for 100-hour inspection. Steve Germick of Teterboro, N. J., stopped at Executive to give the DC-3 of the Texas Co. a general overhaul and refurnish the interior before continuing his flight to Houston. Bill Dameron, pilot for Sears, Roebuck Co., Atlanta, brought their DC-3 to Executive Aircraft Service at Dallas for engine change, annual inspection, new electrical system, installation of radar and some miscellaneous repairs. The DC-3 of the Mene Grande Oil Co., San Tome, Venezuela, was brought by pilot V. "Red" Irwin, chief pilot, to Executive Aircraft Service for general overhaul.

• Frank Di Napoli, Sun Garden Packing Co., San Jose, Calif., recently had a Lear L-2 auto-pilot installed in his Piper Apache at San Jose Avionics Co. shop. The same installation was made on the Beechcraft D-50 brought by pilot Don Weise to San Jose Avionics from the Denny Logging Co. at Healdsburg, Calif. Rod Christenson, pilot for the Dinwiddie Construction Co., San Francisco, brought their Beechcraft B-50 to San Jose for the installation of an ARC 15-D Omni, Glide Path Receiver, and custom control edge lighted radio panel. The ARC Omni, Glide Path Receiver, and Bendix ADF in Food Machinery and Chemical Corp.'s Beechcraft D-18, John Kendall pilot, received semi-annual inspection and modification at San Jose Avionics.

• A Flite-Tronics MB-3 Marker Beacon Receiver was installed in the Twin Bonanza owned by Ohio Oil Company, Findlay, Ohio, and in the Lodestars owned by the Giddings and Lewis Machine Tool Company at Fond du Lac, Wisconsin. Purchase for the Ohio Oil plane was made from Ohio Aviation Company; the George B. Hamilton company worked on Giddings' Lodestars. The Cessna 310 owned by the Hodge Agency, Granite City, Ill., has been equipped with a Flite-Tronics CA-1 Audio Amplifier purchased from Capitol Aviation, Inc., Springfield, Ill.

• Garrett Corp.'s AiResearch Mfg. Div., Los Angeles, recently disclosed an altitude-control mechanism sensitive enough to record an altitude change of 15 inches in less than ¼ second. Designed to convey information to an automatic pilot, AiResearch engineers say it lends itself to imminent development of a highly accurate visual meter.

Nu-Avi-Quip

(Continued from page 49)

Standard ambient temperature range is -25°C to 75°C ; range can be extended to -55°C to 100°C or more on special models. UAC power supplies are as small as 4 cubic inches and as light as 6 ounces, give up to 85% efficiency.

They are available in rectangular shape and can be custom-made to fit any specifications.

New Miniature Shock Resistant RF Noise Filters

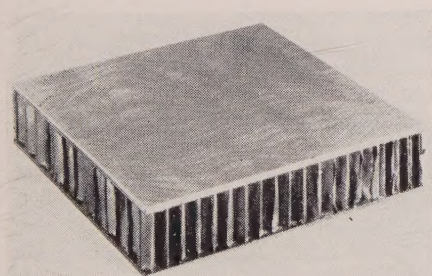
Astron Corp., East Newark, N.J. have announced the development of three new miniature RF filters. These space-saving, light-weight filters are carefully constructed of specially chosen components and materials using subminiature capacitor sections and the latest inductance materials. Their rugged physical construction enables them to withstand great amounts of shock and vibration.

Extremely dependable, Astron RF filters are not affected by elevated operating temperatures. Protective hermetic seals insure long life.



Conolite-and-Paper Panels New for Executive Interiors

An unusually strong yet lightweight structural panel, made of paper honeycomb sandwiched between Conolite plastic laminate, is a new product of Continental Can Co. Of special interest to companies doing or buying executive aircraft conversions, Continental has perfected a method of making the honeycomb-and-Conolite panels in continuous lengths. This permits seam-free application of the new laminate for all manner of airplane interior paneling needs.



The lightness-with-strength lamination is composed of Kraft paper honeycomb, impregnated with phenolic resin for rigidity and faced with Conolite plastic surfacing. Conolite defies alcohol and other liquid stains, resists scratching, chipping, marring, withstands boiling water, acids, greases and temperatures to 350°F . A rinse with a damp cloth cleans the bright surface of this plastic laminate.

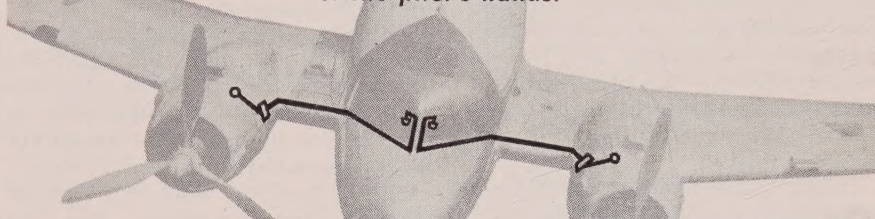
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FOR AVIATION SAFETY

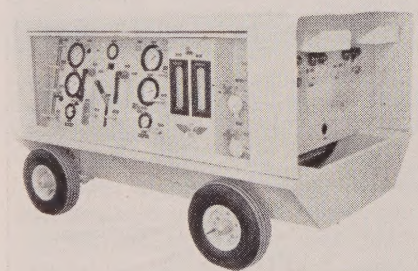
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New Hydraulic Test Stand For Service Bases



Greer Hydraulics, Inc. has introduced a new Dual Hydraulic Portable Test Stand System, #Z828, for checking out airplane hydraulic systems on the flight line which features two complete hydraulic systems within one portable unit in the same space formerly occupied by one complete system of comparable size. An added advantage of the Test Stand is that the two separate and complete systems may be operated together or separately.

Each system contains a 20 GPM, 5,000 PSI hydraulic pump with its own flow meters, by-pass control, volume control, pressure controls and air-to-oil coolers.

In addition to these two systems, there is an additional supply of 10,000 PSI hydraulic pressure for static testing and 65 PSI air pressure for pressurization of aircraft reservoirs.

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WRITE FOR LITERATURE



Aircraft Controls

BARBER-COLMAN COMPANY
Dept. G, 1429 Rock Street, Rockford, Illinois

Navicom

(Continued from page 27)

NARCO, whose research and development of their DME airborne unit was partially sponsored and supported by government, has entered the field with a similar project to develop and produce a lightweight airborne radar suitable for the medium and light-twin class business aircraft. It is conceivable that, with the further employment of miniaturized components, transistors and printed circuits, that an adequate airborne radar unit for the larger single-engine aircraft may someday open this tremendous market.

Other developments in airborne radar which promise easier and more reliable usage include the "bright" tube. An obvious and very disturbing shortcoming of present day airborne radar is the "head down and locked" requirement of close hooded viewing (except at night, of course) which discourages continuous surveillance in daytime IFR and virtually eliminates it in daytime marginal and VFR conditions which are the subject of most concern on account of hi-density traffic and higher closing speeds! Farnsworth's IATRON tube is being investigated by such airborne radar manufacturers as Bendix, Collins and RCA. Also Hughes and RCA are developing comparable "bright" tubes.

As a weather circumnavigation device, plus the anti-collision bonus, radar may very well preclude the further development of pressurization for future usage by piston-engined aircraft of the business and executive class. With the advent of serious production of jet business aircraft, this picture may change.

Airborne Teleprinter May Ease Pilot Burden

A new airborne communication system, designed to provide printed weather and traffic information for pilots on the North Atlantic run has been developed for commercial airlines by FTL and two British affiliates of IT&T. The system was tested recently on a transatlantic flight. (BOAC) Subsequent development may offer possibilities for domestic use in twin-engine size aircraft.

Part of the ground-to-air radio project called Narcast (North Atlantic Airborne Radio-teleprinter Broadcast), the new system consists of a low-frequency airborne receiver and two ground stations operating on different frequencies. The receiver converts weather and traffic information transmitted from the ground stations

into printed messages on a teleprinter at speeds up to 100 words a minute.

Ground stations for Narcast are situated at Halifax, N.S., and Galde-
noch, Scotland. Each has an approximate range of 1,000 nautical miles.

The system was designed to supplement existing voice channels, on which weather information currently absorbs nearly 80 per cent of the traffic. The system would free these channels for traffic control and instruction signals.

Present air-ground-air high-frequency circuits lack full reliability because of fading, channel saturation and the possibility of manual error in transcribing messages. The teleprinter was designed by Creed and Company, Ltd., of London, while the receiver used in the transatlantic test was manufactured by Standard Telephones and Cables, Ltd.

Proposed Revision Control-Zone VFR Rules

As a consequence of a growing file of incidents, including some accidents, the Civil Aeronautics Board last March announced certain proposed revisions to both CAR 43, General Operations Rules; and CAR 60, Air Traffic Rules. Comments on the proposed revisions were solicited up to a terminating date of May 25, 1956. The gist of the comments received from the flying public indicated a surprisingly widespread area of disagreement as to the proper interpretation of the proposed revisions.

Briefly, the revision to CAR 43.65 and 43.68, Instrument Flight Limitations, will require that a pilot will not operate an aircraft *below the lowest VFR minimums as newly described regardless of any traffic clearance received*, unless he holds a *valid* instrument rating, as defined elsewhere in the Civil Air Regulations. When effective, a VFR pilot may no longer avoid the necessity for meeting IFR requirements *below 1 mile visibility*, for instance, by obtaining a "control VFR" clearance as provided in CAR 60 and ANC/IFR (Army-NAVY-CAA IFR Procedures).

Secondly, CAR 60.30, Ceiling and Distance From Clouds; although it does not prohibit "control VFR" flight below a ceiling of less than 1000 ft. within a control zone provided a traffic clearance is received, it does emphasize that such a tower clearance does not relieve the VFR pilot of the necessity of observing *the VFR visibility minimums*; i.e., he cannot climb up through or let down through the cloud condition producing the reported *ceiling* (broken clouds or overcast). For the first time, the pilot will

have a specific "rock-bottom" VFR visibility minimum of one mile both in as well as outside of a control zone, regardless of an ATC clearance.

CAR 60.31, which contains the meat of the revisions, will require that both ground and flight visibility within a control zone must be *not less than one mile*, even with a clearance; *unless* the restriction to visibility is caused by a purely local condition at the surface, as smoke, dust, blowing snow or sand, wherein all turns after takeoff or prior to landing can be accomplished above or outside of the condition. In this case, one-half mile is permissible, somewhat equivalent to the aircarrier sliding scale on visibility minimums.

Paradoxically, there is still no equivalent for the non-aircarrier IFR pilot, of the aircarrier sliding scale on IFR visibility minimums below the Flight Information Manual limits, except by the impracticable method of individual location waiver. With a ceiling or cloud base so high as to be not a significant factor, a pilot equipped and competent to execute an IFR approach in a low-visibility condition only, must adhere to the same visibility minimum as required when he has to contend with lowest minimum ceilings.

In the past, this has resulted in an odd situation whereby a competent pilot on IFR plan has been unable to execute a full IFR approach, unquestionably the safest procedure, while a comparative novice, operating "control VFR" made a hairy "contact" approach to a landing in full legality but in violation of every tenet of safe flying. In desperation, full IFR-plan approaches in such conditions have been carried to the final approach stage at which time, with traffic separation built-in, a "control PFR" clearance has been requested and landing completed.

Rumor has it that Takeoff Minimums for general aviation (currently not enforceable in CAR 609) are the next item on the agenda. At the present time, business aircraft crews are still establishing their own on the wide basis of everything from copying air-carrier minimums to minimums decided upon by the VIP passenger riding behind in the plush cabin.

New IFR Chart Plotter Simplifies Off-Airways Calculations

Users of the popular Airways Manual Avigation charts for instrument navigation and flight planning will be pleased to hear of the availability of a new, pocket-size device that simpli-

(Continued on page 56)

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EXECUTIVE AIRPLANE—TWIN CESSNA 310. Late model with 800 hours on airframe and low engine time. Special equipment includes navigational aids and automatic pilot. Fastest and safest in low price field. Cruises 210 mph. One owner, selling because of "graduating" to larger plane. Priced right for interested buyer. This ad by owner—not a broker. Write Box No. 709 or Phone Wichita, Kansas, Whitehall 38161.

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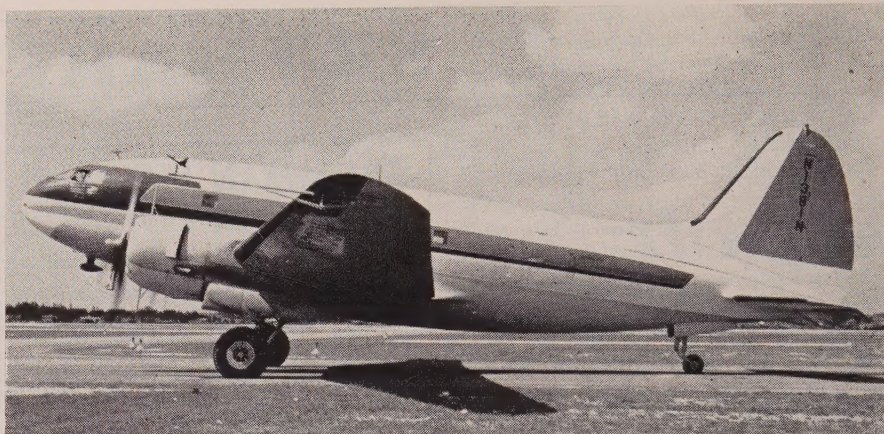
- U. S. citizen
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- Age 21-30 (Will consider men up to age 32 if have 1500 hours or more)
- 5'8" to 6'4" in height
- 20/20 vision without use of glasses or contact lens
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For current and future openings, write immediately detailing personal qualifications, work experience and flight time to:

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TWO YEARS' RESEARCH and developed by L. B. Smith Aircraft Co., Miami, Fla. (NBAA member) and Air Carrier Engineering Services resulted in this C-46/CW-20T, now CAA certificated under modern transport category classification for airline and business use.

Chemical De-Icing Given Impetus By Air Force

The recent tragic accident of an oil company Lockheed in Ohio adds significance to an announcement by the Armour Research Foundation of Illinois Institute of Technology, Chicago.

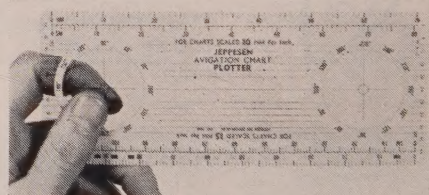
Chemical compositions that effectively prevent ice accumulation on aircraft surfaces are being developed for the Air Force. Conventional wing and tail anti-icing equipment may soon be eliminated. The new development contrasts with previous approaches like Icex, the currently-available compound which, when spread on propeller and wing de-icer boots, or other surfaces, discourages the adhesion of ice, by emphasizing *freezing point depressants* and *heat-releasing* chemical compositions, thus actively combatting the ice itself. The previous anti-adhesive type compounds effectiveness rapidly deteriorated with rain and exposure requiring frequent anticipatory renewal.

Designed to prevent ice formation, particularly during climb through dangerous icing conditions, the new compounds can be brushed or sprayed on, or applied *in the form of tape*. One of the compositions will enable the pilot to get rid of ice that has *already* accumulated by use of a protective film that can be activated at the will of the pilot.

(Continued from page 52)

fies and all but eliminates the onerous chore of off-airways computing for direct route planning.

The Avigation Chart Plotter is less than 8" by 3", rectangular and has four scales to match all of the standard Jeppesen avigation charts. Both statute and nautical miles are easily measured.



For reading off-airways magnetic courses, a compass rose is etched on each end of the plotter with degrees reading counter clockwise. By placing the center of the compass rose over the radio facility location and rotating the plotter until the plotter's horizontal centerline lines up with the desired course, the magnetic course desired can be read directly off the plotter's compass rose at the magnetic north small black arrow found above each radio facility on the charts.

Additionally, a WAC and Sectional chart statute mile scale is available on either end face of the plotter. But principally, the plotter represents a welcome relief from the awkward practice of using either the mileage scale on the edge of one avigation chart to measure off-airway distances on another or a separate straight-edge (usually the envelope of a letter you forgot to mail for the wife on the way to the airport) and pencil. And there is an obvious advantage in being able to measure quickly with some degree of accuracy a total mileage figure up to 210 mm/242 sm without tedious adding to fix-to-fix figures.



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